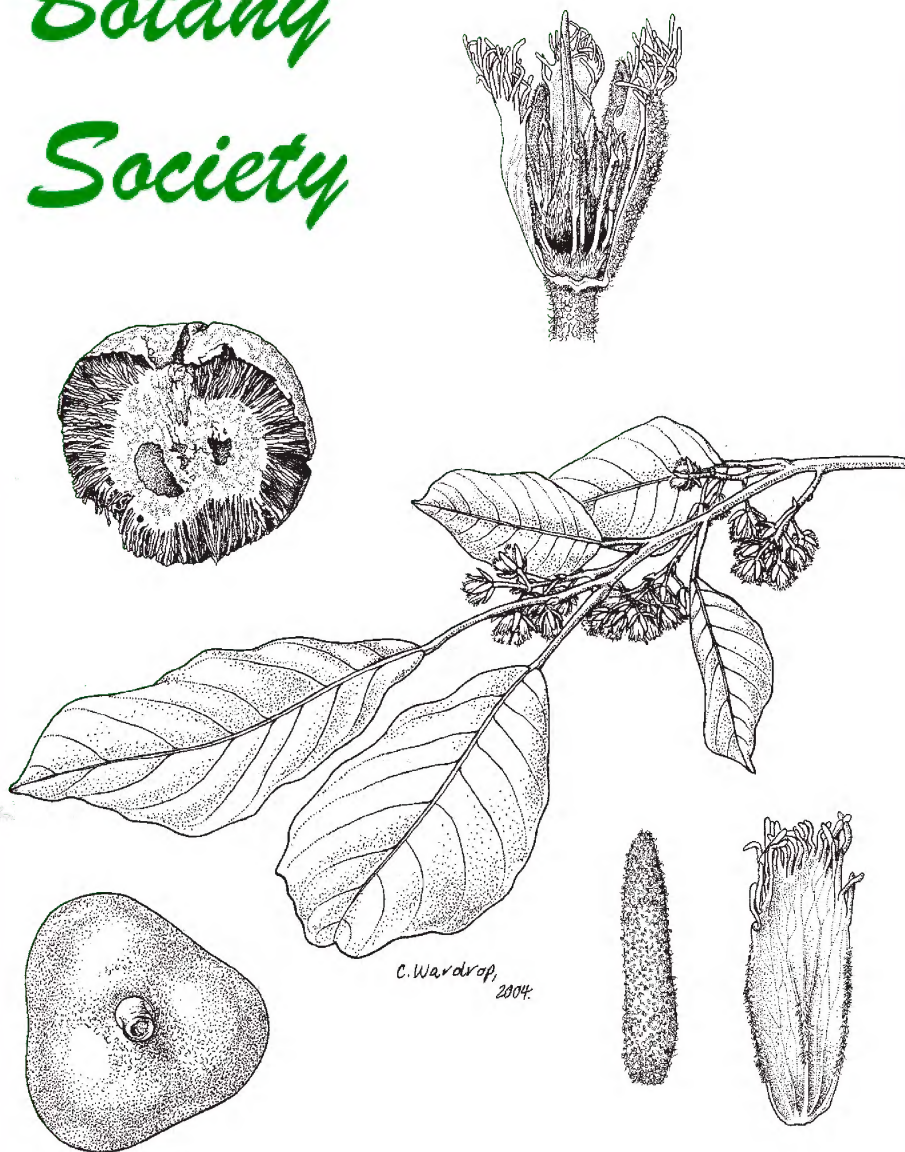


ASBS

Australasian Systematic Botany Society



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AUSTRALASIAN SYSTEMATIC BOTANY SOCIETY INCORPORATED

Council

President

Darren Crayn
Australian Tropical Herbarium (CNS)
James Cook University, Cairns Campus
PO Box 6811, Cairns Qld 4870
Australia
Tel: (+61)/(0)7 4232 1859
Email: asbs_president@anbg.gov.au

Secretary

Leon Perrie
Museum of New Zealand Te Papa Tongarewa
PO Box 467, Wellington 6011
New Zealand
Tel: (+64)/(0) 4 381 7261
Email: leonp@tepapa.govt.nz

Councillor

Jennifer Tate
Institute of Fundamental Sciences
Massey University
Private Bag 11222, Palmerston North 4442
New Zealand
Tel: (+64)/(0) 6 356- 099 ext. 84718
Email: J.Tate@massey.ac.nz

Vice President

Daniel Murphy
Royal Botanic Gardens Victoria
Birdwood Avenue
Melbourne, Vic. 3004
Australia
Tel: (+61)/(0) 3 9252 2377
Email: daniel.murphy@rbg.vic.gov.au

Treasurer

John Clarkson
Queensland Parks and Wildlife Service
PO Box 975, Atherton Qld 4883
Australia
Tel: (+61)/(0) 7 4091 8170
Mobile: (+61)/(0) 437 732 487
Email: john.clarkson@qld.gov.au

Councillor

Mike Bayly
School of Botany
University of Melbourne, Vic. 3010
Australia
Tel: (+61)/(0) 3 8344 5055
Email: mbayly@unimelb.edu.au

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Australian Conservation Taxonomy Award:
on 22nd May 2015, 2016

Public Officer

Anna Monro
Australian National Botanic Gardens
GPO Box 1777
Canberra, ACT 2601
Tel: +61 (0)2 6250 9530
Email: anna.monro@environment.gov.au

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Web presence

ASBS Website: www.asbs.org.au

Webmasters

Anna Monro
Australian National Botanic Gardens
Canberra, ACT 2601 Australia
Tel: (+61)/(0) 2 6250 9530
Email: anna.monro@environment.gov.au

Murray Fagg

Australian National Botanic Gardens
Tel: (+61)/(0) 2 6250 9561
Email: murray@anbg.gov.au

ASBS Facebook Group

Viewable currently to any member of Facebook;
permission to post by application to administrators.

Administrators

Todd McLay, email: tmclay@unimelb.edu.au
Mike Bayly, email: mbayly@unimelb.edu.au

Cover image: *Elaeocarpus sedentarius* Maynard & Crayn.

Leafy twig with clockwise from top: open flower, petal, sepal, proximal end of fruit, longitudinally sectioned fruit.
Artist: Catherine Wardrop (NSW). With permission of CSIRO Publishing.

Publication dates of previous issue

Australas. Syst. Bot. Soc. Newslett. 165 (December 2015)
ASBS Web site: 3rd Feb 2016. Printed version: 9th Feb 2016.

From the President

The year is moving along, and Council has been busy. Following is a brief update on some of the major activities and developments involving the Society.

National Taxonomy Workshop

In keeping with the Society's mission to support botanical systematics, Council this year offered financial support in the form of registration fee waivers (up to AU\$400 value) to ASBS student members attending the National Systematics Workshop to be held in Adelaide in July. This workshop represents an unrivalled training opportunity for students in the first three years of their candidature. Workshop topics include phylogenetic methods, imaging techniques, DNA barcoding, systematics theory, nomenclature and the taxonomic process, collection management, databases, publishing results, finding a job, and much more.

The course is now fully subscribed for this year but the Society will keep members informed of developments regarding future workshops.

ASBS 2016 Conference

Preparations for the Alice Springs meeting have been going well. I understand venues have been booked, catering is nearly organised, and the session themes are close to being finalised. The conference website is up and running (Web ref.). Please check it out, and in particular I encourage you to register your interest in attending (or not) via the website. Registration will also enable you to receive updates as they are posted. A full report from the organising committee appears on p. 3 of this issue.

Web ref. <http://asbs2016.ourplants.org>

Future ASBS conferences

Council is keen to keep an eye on the horizon and is already in discussions regarding the 2017 conference. At this stage a joint meeting with the Society of Australian Systematic Biologists (SASB) in Adelaide is the preferred option. The last time the SASB and ASBS met together was the very successful Sydney 2013 conference. Delegates strongly endorsed the joint meeting model, and financially the Society did well too.

While colleagues at the Queensland Herbarium and Queensland University of Technology had made an attractive offer to host the 2017

meeting in Brisbane, Council realised that should we not meet with SASB next year then there would be no further opportunity before 2021. The SASB meets once every two years and had already locked in Adelaide as their venue for 2017. Our Brisbane colleagues have kindly offered to host ASBS 2018 instead. The following meeting, 2019, should be across the ditch in New Zealand.

Hansjörg Eichler grants

On the advice of the Financial Grants Standing Committee, Council has raised the maximum award under the Eichler scheme to AU\$5000 effective from the current round. Five applications have been received and the Research Committee is assessing these. Their work will be challenging if the high quality of applications submitted in recent past rounds is maintained. I am a little surprised that the significant increase in award value (from \$2000 to \$5000) didn't generate a surge of applications, but perhaps this will occur in future rounds as the changes bed down. As always, the Research Committee members are thanked for their efforts, as are the Financial Grants Committee members for strategic advice.

Decadal Plan

The Society continues to play a key role in building the business case for increased investment in systematics in Australia – this business case we are calling (for now) the Decadal Plan. The Plan team comprises representatives of key organisations (ASBS, SASB, CHAH, CHAFC, etc.) and other interested individuals. The early development of the Plan was a botanically focused exercise but the intention was always to broaden to include the whole biological systematics enterprise in Australia and New Zealand. That broadening has now been achieved with the non botanical systematics communities on board through the SASB and the Council of Heads of Australasian Faunal Collections (CHAFC). Further to this, the team is considering how the Plan might enable deeper, more effective and more sustainable engagement with our regional neighbours in the South Pacific, New Guinea and southeast Asia. As has been highlighted

ad nauseum, developing nations harbour most of the world's biodiversity but relatively little of its taxonomic capacity. This disarticulation of taxonomic demand and supply is a critical issue for conservation and development that we in the first world have a responsibility to help address.

The Decadal Plan team is currently engaging with the Australian Academy of Science and the Royal Society of New Zealand to ensure our efforts are well targeted politically, and actively seeking significant funding to undertake further development of this roadmap for our future.

Newsletter cover art

One of the perks of the office of President (perhaps the only one) is the right to choose the cover art of the *ASBS Newsletter*. The Elaeocarpaceae, and in particular *Elaeocarpus*, has for some time been a principal research interest of mine. For my term I have chosen an illustration of *Elaeocarpus sedentarius* Maynard & Crayn rendered by one of the two wonderful staff illustrators at NSW, Catherine Wardrop. The systematics of this species was the subject of an Honours study by David Maynard who was co-supervised by Dr Maurizio Rossetto and me. It has additional

significance for the Society in that the research was supported with \$1000 awarded to David from the Society's Hansjorg Eichler Scientific Research Fund. The results were reported in *ASBS Newsletter* 126: 17 (March 2006) and in the following two papers:

Maynard, D, Crayn, D, Rossetto, M, Kooyman, R, Coode, M (2008) *Elaeocarpus sedentarius* sp. nov. (Elaeocarpaceae) – morphometric analysis of a new, rare species from eastern Australia. *Australian Systematic Botany* 21, 192-200.

Crayn, DM, Rossetto, M, Maynard, DJ (2006) Molecular phylogeny and dating reveals an Oligo-Miocene radiation of dry-adapted shrubs (Tremandraceae) from rainforest tree progenitors (Elaeocarpaceae) in Australia. *American Journal of Botany* 93, 1328-1342.

And finally ...

As always, as your President my door (and phone and email inbox) is always open. I encourage you to let me know of any issues or concerns you may have with the Society and its processes ideally accompanied by suggestions for improvement, or even (heaven forbid) kind words of encouragement when we get something right!

Regards
Darren Crayn

ASBS Inc. business

A request from the Treasurer

I would like to try to achieve something that I think most Treasurer's dream about, but to do so I need your help. I'd like to have all subscriptions for 2016 paid by the end of the financial year. If you still have to pay this year's subscription I'd love to hear from you. If you are unsure if you have paid or not, please

get in touch with me, I'd be happy to check. If for some reason or other you no longer wish to continue with your membership of the Society, I'd still like to know, so that I can note this in the membership database.

John Clarkson
john.clarkson@qld.gov.au

Australasian Systematic Botany Society Inc.

Notice of 2016 Annual General Meeting

In accordance with with Section 25 of the Society's Rules, notice is hereby given that the annual general meeting of the Australasian Systematic Botany Society Inc. will be held on **Monday 26th September at the DoubleTree by Hilton Hotel in Alice Springs, beginning at 4.30 pm local time.** This is during the Society's annual conference.

The purpose of this meeting is to:

- confirm the minutes of the annual general meeting held on 30th November 2015 (see *ASBS Newsletter* 165: 4–24);
- receive reports from Council on activities of the Society during the preceding financial year;
- declare the results of the vote for membership of Council.

Coming meetings

ASBS conference and field trip 2016

Alice Springs 26–29th September 2016

Conference 26–28th September

Theme: 'Systematic Botany—a view from the Centre'

Venue: Doubletree by Hilton, Alice Springs

Local field trip: 29th September 2016, around Alice Springs (itinerary being developed)

Local organiser: Peter Jobson

Co-convener: Michelle Waycott

Web site: <http://asbs2016.ourplants.org>

We plan that *Systematic Botany—a view from the Centre* will be a conference celebrating our uniquely Australian environment that has led to an original and intriguing flora.

Conference themes

The conference themes will include:

- Systematics and evolution of Australian and other arid zone floras
- The biodiversity, systematics and taxonomy of the Australian arid and savannah flora
- New initiatives in identifying and managing introduced plants – weeds, genes and taxonomy on a global scale
- Taxonomy in decision making – the importance of recognising and maintaining core resources and skills that relate to the management of Australia's natural resources

- Innovative data management in the 'big data'-'global data' age

Botany of the first Australians

We also hope to have a session highlighting traditional botanical knowledge and what benefits can come from partnering with traditional owners of land and seascapes.

Registration

The organising committee encourages everyone who might even be remotely tempted to attend to register for ongoing updates on the website

Registration, invited speakers, local planning options and an ever-evolving program will be highlighted through this service.

See you in the Alice!

Come and join us in Alice Springs for what should be a wonderful, friendly and interesting conference.

This conference is being jointly run by the Systematic Botanists from Northern Territory and South Australia. In the spirit of partnership, collaboration and sharing the load, we look forward to you joining us in Alice Springs in September.

13th Australian Bryophyte Workshop in South Australia Date changed to late August 2016

Please note the change of date for the 13th Australian bryophyte workshop. It will now be held from Saturday 20th August to Friday 26th August 2016.

The first part of the workshop will be based at Pichi Richi Park near Quorn in the southern Flinders Ranges. The last two days will take place in Adelaide at the University of Adelaide.

The website for the conference has more detailed information and a registration form. Since it may be necessary to limit registrations to 25 people please register early if you wish to participate.



Web site: <http://bryology.ourplants.org/>

31st John Child Bryophyte and Lichen Workshop

Coromandel Peninsula, New Zealand, December 2016

Contact: Betina Fleming
fleming.betina@gmail.com

The 31st John Child Bryophyte and Lichen Workshop will be based at Coroglen on the eastern side of the Coromandel Peninsula, on the North Island of New Zealand, and will run from 2nd December (arrivals) to the 7th December (departures).

The forests of almost the entire Coromandel Peninsula were felled and the area extensively mined for gold soon after European settlement in the 19th Century. There are just a few isolated valleys that were simply too steep for timber cutting or gold extraction. Thus many of the proposed collection areas will be in secondary growth forests, as these are the most readily accessible. The forests that we will visit are composed of podocarp-broadleaf assemblages, with New Zealand's famous Kauri (*Agathis australis*) dominating in localised patches.

Annual rainfall is high, around 1850 mm, and because of proximity to the sea, the temperatures are mild year round, making the area a bryologists dream. In spite of its close proximity to Auckland, this spectacularly beautiful area is relatively isolated and sparsely populated, with many beautiful beaches and the steep, rugged mountains of the central Coromandel Range forming a spine along the length of the peninsula.

Accommodation has been booked for 40 at the Riverglen Holiday Park, but there is a range of other accommodation available in the local area.

Please email me for further information and to have your name placed on the contact list for further emails.

Australasian Systematic Botany Society Inc.

Nominations for membership of the 2016–17 Council

In accordance with Section 13 of the Society's Rules, nominations are hereby called for membership of Council. Council consists of the following positions:

President, Vice-President, Secretary, Treasurer and two (2) Councillors.

Nominations must be received by the Secretary, Leon Perrie at Museum of New Zealand Te Papa Tongarewa, PO Box 467, Wellington 6011, New Zealand (leonp@tepapa.govt.nz) before 5 pm Friday 22nd July.

Nomination forms can be obtained from the Secretary (leonp@tepapa.govt.nz) or from the ASBS web site at www.asbs.org.au/council/2016-17_Council_Nominations_Web.pdf

Notes

- A member may be nominated simultaneously for any number of positions on Council but is ineligible to hold more than one position at one time.
- Interested members are encouraged to nominate for a position on Council.

Australasian Systematic Botany Society Inc.

Australian Conservation Taxonomy Award

Applications close on May 22nd 2016

We invite applications from members.

For eligibility and other information see the ASBS website or contact Vice-President Dan Murphy (address inside front cover)

Eichler Research Fund reports

Phylogeny of Loganiaceae tribe Loganieae, using chloroplast and nuclear ribosomal sequence data.

Kerry Gibbons

The University of Sydney and National Herbarium of NSW

Loganiaceae R. Br. ex Mart is a predominantly tropical to subtropical family with occasional extensions into higher latitudes. Areas of highest generic diversity include the Americas, Africa and Australasia. Cladistic analyses of both morphological (Bremer and Struwe 1992; Struwe et al. 1994) and molecular (Backlund et al. 2000) data have confirmed the polyphyletic nature of Loganiaceae as previously circumscribed and a well supported core Loganiaceae has now been defined. Tribal relationships have also been clarified and Loganieae has been expanded to include several genera (*Mitreola* L., *Mitrasacme* Labill., *Schizacme* Dunlop and *Phyllangium* Dunlop) previously placed in Spigeliaceae (Struwe 2004; Heywood et al. 2007). Loganieae now includes all loganiaceous genera present in Australia and New Zealand except the pantropical *Strychnos* L. (Strychnae).

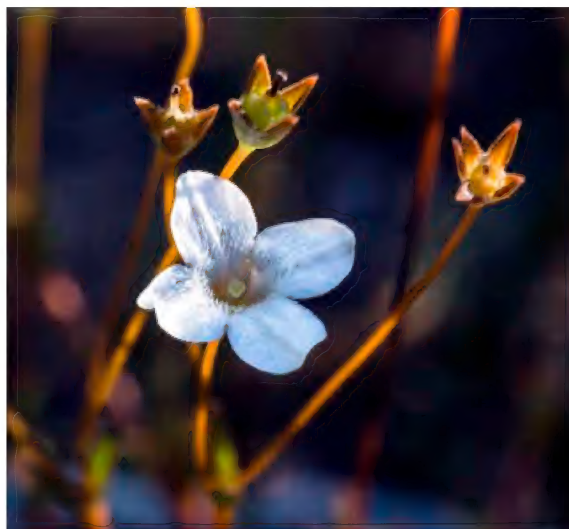
Originally, my PhD was going to focus on the near endemic *Mitrasacme* (Fig. 1) and its segregates *Phyllangium* and *Schizacme*. We were interested (among other questions) in whether Dunlop's genera might render *Mitrasacme sensu* Dunlop paraphyletic. However, it became apparent during my early reading that generic relationships in Loganieae were not well enough understood to be sure what a suitable outgroup for a phylogeny of *Mitrasacme* and its segregates should be. A preliminary phylogenetic analysis of Loganieae with the aim of clarifying intergeneric relationships and testing generic limits was needed.

Additionally, there remained within the tribe a number of unanswered questions that could be explored within the context of a phylogeny of Loganieae. *Logania* R.Br. sect. *Logania* and *L.* sect. *Stomandra* R.Br. are separated by a number of morphological characters. In a previous cladistic analysis of morphological data (Struwe et al. 1994), *Logania* was paraphyletic with respect to *Mitrasacme* and

Mitreola in some phylogenies. Here was an opportunity to test the monophyly of *Logania* and of its sections. Conn (1980) proposed that the Hawaiian endemic *Labordia* Guidich. be regarded as a subgenus of *Geniostoma* J.R.Forst. & G.Forst., a classification not followed by Wagner (1990). Molecular analyses (Backlund et al. 2000), using only a single species from each genus, have confirmed a close relationship between the genera. The relationships and generic boundaries of *Labordia* and *Geniostoma* could be tested by including a more taxonomically inclusive sample within a phylogeny of Loganieae. *Geniostoma rupestre* J.R.Forst. & G.Forst. is a polymorphic species with a confusing degree of morphological intermediacy. This led Conn (1980) to describe a large complex with 12 varieties, placing a number of species in synonymy. The monophyly of the *G. rupestre* complex *sensu* Conn could also be tested. We were also interested in the south Western Australian endemic *Mitreola minima* B.J.Conn. *Mitreola* is predominately distributed in the Americas, Asia and Madagascar. However, one widespread species, *M. petiolata* (J.F.Gmel.)

Fig. 1: *Mitrasacme polymorpha*.

Ph. Murray Henwood



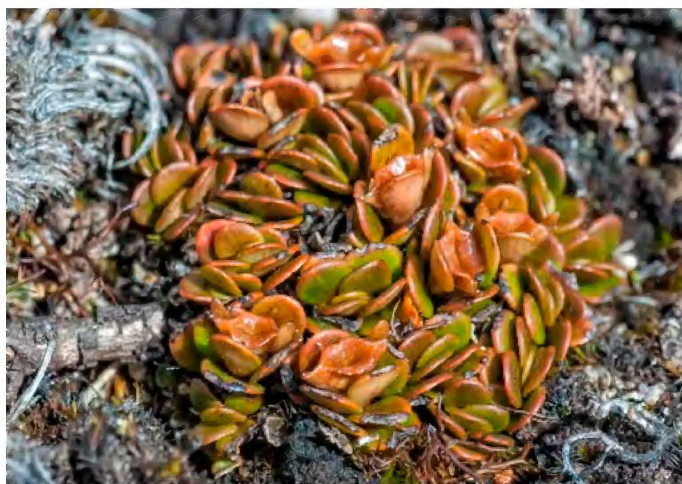


Fig. 2: *Schizacme montana*, showing capsules. *Schizacme* and *Phyllangium* were placed sister to each other and to a monophyletic *Mitrasacme*. Ph. Murray Henwood.

Torr. et Gray, extends to New Guinea and the Australian Monsoon Tropics. *Mitreola minima* appears, therefore, to be a geographic outlier and we were interested in its relationship to the rest of the genus. A grant from the Eichler Research Fund enabled me to expand the focus of my PhD to include a molecular phylogenetic analysis of Loganiaceae before studying *Mitrasacme* and its segregates in more detail.

Maximum parsimony and Bayesian phylogenetic analyses of nuclear ribosomal ETS and the chloroplast intron *petD* resolved a monophyletic Loganiaceae with strong support (Gibbons et al. 2012). *Mitrasacme* was also strongly supported as monophyletic, with its segregates *Schizacme* (Fig. 2) and *Phyllangium* forming a clade sister to *Mitrasacme*. To our great surprise and excitement, *Mitreola minima* was placed not within *Mitreola* but sister to *Mitrasacme* and its segregates with strong support. This made a lot of sense biogeographically, since *Phyllangium* is also present in the southwest. *Mitreola minima* and *Mitrasacme* and its segregates also share stipules reduced to a membranous interfoliar sheath (a synapomorphy for this clade) and valvate corolla aestivation. Additionally, the characters shared between *Mitreola minima* and the remainder of *Mitreola* are either widespread in Loganiaceae (5-merous androecium and perianth) or also present in *Phyllangium* (semi-inferior ovary). We have now transferred the taxon previously known as *Mitreola minima*

to a new monophyletic genus endemic to south-western Australia, *Adelphacme* K.L.Gibbons, B.J.Conn & M.J.Henwood (Gibbons et al. 2013).

The Hawaiian endemic genus *Labordia* was nested within the more geographically widespread *Geniostoma*, within a clade of samples collected from New Caledonia, Fiji and New Zealand. Samples collected from New Guinea formed a strongly supported clade sister to the rest of *Geniostoma*. The *Geniostoma rupestre* complex appeared paraphyletic. None of

this came as much surprise. There is a clear need for a revision of *Geniostoma*, but that task was outside the scope of my thesis. The historical biogeography of *Geniostoma* would also be fascinating and there is a great, albeit challenging, project waiting for someone.

Although *Logania* sect. *Logania* and *L.* sect. *Stomandra* each appeared monophyletic, there was no support for the monophyly of *Logania* as a whole. Subsequently, Charles Foster looked at *Logania* in more detail for his honours project, transferring *L.* sect. *Stomandra* to a new genus *Orianthera* C.S.P.Foster & B.J.Conn (Foster et al. 2014). Foster's (2015) Eichler Fund report recounts what else he did.

The rest of my PhD included looking in more detail at the New Zealand *Mitrasacme* (Gibbons et al. 2014) and clarifying accepted names in this genus outside Australia (Gibbons et al. 2015). I also completed a molecular phylogeny of *Adelphacme*, *Mitrasacme*, *Schizacme* and *Phyllangium*, which will be submitted for publication later this year. I've taken to calling these four closely related genera the *Mitrasacme* alliance; it is a lot easier to say.

Acknowledgements

I wish to thank Anne Terley, my field volunteer on a six week collecting trip to NT and far north Queensland. Many thanks also go to those who have provided me with material, sometimes from far afield. These are Russell Barrett (*Phyllangium* from WA), Elizabeth Brown (*Geniostoma* from Fiji and New Zealand), Andrew Perkins (*Logania* from WA), Shelley James from the Bishop Museum, Honolulu,

(for material of *Labordia* held in cultivation by the US army in Honolulu) and Esti Arianti, Kebun Raya Bogor, Indonesia (*Spigelia* and *Neuburgia* held in cultivation). Thank you also to Dale Dixon for permission to extract DNA from herbarium specimens of *Mitreola* held at NSW. And of course, I am indebted to my supervisors Barry Conn and Murray Henwood, for all their wisdom and support.

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Phylogeny and biogeography of *Zieria* (Rutaceae)

Rose Barrett

School of BioSciences, The University of Melbourne

Zieria (Anthophyta: Rutaceae) is a predominately Australian genus of shrubs and small trees, consisting of 59 Australian species and one species endemic to New Caledonia (Fig. 1). Although there has been considerable taxonomic revision of this genus in recent decades, largely based on morphology (Armstrong 2002; Duretto and Forster 2007, 2008), a comprehensive molecular phylogenetic study was clearly needed. One of the main aims of my Ph.D. research (recently submitted) was to produce a phylogeny for *Zieria* based on chloroplast and nuclear ribosomal DNA (cpDNA and nrDNA) that would include as many currently-recognised taxa as possible. Almost all species of *Zieria* were represented in the study, and separate analyses of cpDNA and nrDNA datasets were undertaken using both Bayesian inference and maximum parsimony methods, and the monotypic sister genus *Neobyrrnesia* as the outgroup.

The financial support provided by the Hansjörg Eichler Scientific Research Fund enabled the development of two additional cpDNA markers (*rpl32-trnL* and *trnS-trnG*), which would not have been possible otherwise. The *rpl32-trnL* and *trnS-G* regions were the most useful of the cpDNA markers used, being relatively straightforward to amplify and sequence, and having the highest number of parsimony informative characters (88 and 83 respectively, compared to 32 in *trnQ-5'rps16* and 27 in *trnL-F*). As a result, analysis of a larger cpDNA dataset (that included four markers) greatly improved the resolution I obtained.

The cpDNA phylogeny of *Zieria* is already published (Barrett et al. 2015). The results (based on 116 samples, including multiple accessions for some taxa and representing all species of *Zieria* except one) showed

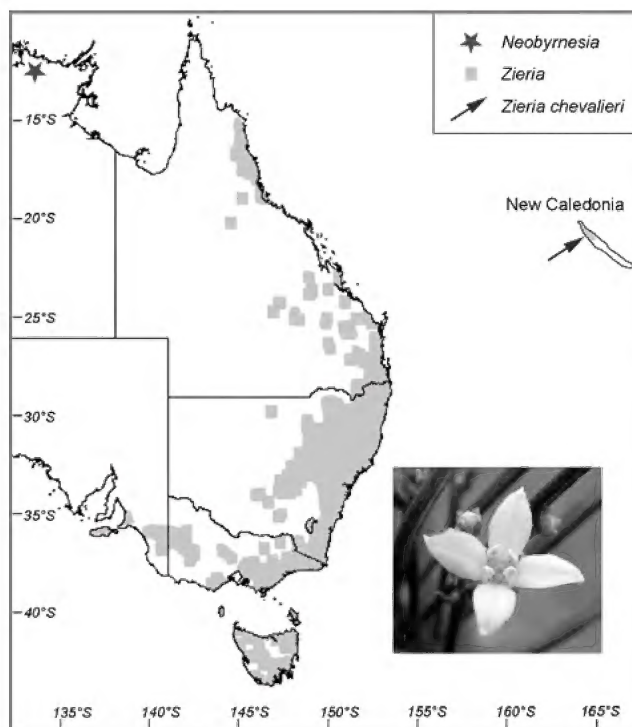


Fig. 1. Distribution of *Zieria* and *Neobyrsesia* (outgroup) in Australia and New Caledonia, adapted from Armstrong (2002). Inset: the flower of *Zieria chevalieri*, Mount Kaala, New Caledonia.

relationships within *Zieria* to be complex. There was widespread incongruence between cpDNA, nrDNA and currently recognised taxa, with cpDNA data showing 14 species as polyphyletic or paraphyletic. These included widespread species (e.g. *Z. smithii* and *Z. arborescens*, each falling into at least four well supported clades) and some with narrow geographic ranges (e.g. *Z. alata* and *Z. oreocena*). No species represented by three or more samples was resolved as monophyletic by the cpDNA data. It is likely that a combination of factors explains this incongruence, including regional cpDNA introgression (chloroplast capture), incomplete lineage sorting and inappropriate taxonomic boundaries.

The cpDNA data analysis provided useful insight into the evolution of *Zieria* but, because of the complexity of the results, it did not provide a clear basis for assessing phylogenetic relationships and monophyly of taxa. The nrDNA (ITS + ETS sequences) provided greater support for monophyly of species than cpDNA, and potentially a better indication of phylogeny (a manuscript for publication of

this part of the research is in preparation). However, deeply divergent paralogues of nrDNA were detected in some taxa, making the assessment of phylogenetic relationships more challenging. These data, nonetheless, highlighted a number of taxa that require reappraisal and possibly re-circumscription.

The phylogenetic relationship of Australian taxa and *Z. chevalieri*, the single endemic New Caledonian species, is of particular interest in terms of the long-standing debate over the history of New Caledonia and its flora. In this study, the placement of *Z. chevalieri* differed between cpDNA and nrDNA trees. The cpDNA phylogeny placed *Z. chevalieri* as sister to all other species in the genus, suggesting that the earliest divergence was between lineages of New Caledonia and Australia, consistent with a vicariance hypothesis. In contrast, *Z. chevalieri* was placed higher in the nrDNA tree, which could suggest later dispersal to New Caledonia, over water or via past exposed land in the Tasman Sea, rather than older vicariance. However, the results did not favour one hypothesis over another, and the debate will continue.

I would like to thank the Australasian Systematic Botany Society for supporting this work through the Eichler Foundation. I also thank Dr Michael Bayly, Prof. Pauline Ladiges and Prof. David Cantrill for their support and advice in conducting the study.

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Investigating the phylogeny, morphology, genetic diversity, phylogeography and ecology of *Spyridium parvifolium*

Catherine Clowes

The University of Melbourne (cclowes@student.unimelb.edu.au)

The genus *Spyridium* includes around 45 species found in south-eastern and south-western Australia (Kellermann & Barker 2012). *Spyridium* is part of the tribe Pomaderreae within the family Rhamnaceae (Aagesen et al. 2005). Phylogenetic analysis of the tribe using nuclear and chloroplast DNA regions has been undertaken with around a third of the species of *Spyridium* included in the analysis (Aagesen et al. 2005; Kellerman 2007; Kellermann & Udovicic 2008). One general conclusion of these investigations was that *Spyridium* formed a monophyletic group. *Spyridium parvifolium* (Hook.) F.Muell. was one of the species of *Spyridium* included within these investigations.

Spyridium parvifolium is a small-medium shrub found in south eastern Australia, from the southern Flinders Ranges in South Australia, throughout Victoria into southern New South Wales and Tasmania (Curtis & Morris 1993; Foreman et al., 1993; Harden, 2000; Jessop et al. 1986). Four varieties of *S. parvifolium* have been described in the past: the typical variety, var. *molle* (Hook.f.) Benth., var. *hirsutissimum* Benth., and var. *grande* Benth. (Curtis & Morris 1993; Foreman et al. 1993). These varieties were generally distinguished by stem leaf characters (e.g., var. *grande* was described as having large leaves greater than 25 mm; Fig. 1; Foreman et al. 1993), distribution (e.g., var. *hirsutissimum* was described as endemic to Mt Zero in the Grampians; Foreman et al. 1993), or a combination of both (e.g., var. *molle* and var. *parvifolium* were considered restricted to Tasmania, var. *molle* having grey-green stem leaves covered in soft

hairs and var. *parvifolium* stem leaves glabrous and green on the upper surface; Curtis & Morris 1993). Varieties of *S. parvifolium* are not recognised as distinct taxa in the current Australian Plant Census (Web ref. 2), although it is noted that the two varieties present in Tasmania are treated as distinct taxa in Tasmania (de Salas & Baker 2014). In addition to these varieties, two loosely described forms of *S. parvifolium* exist: a small (3-5 mm) notched-leaved population in the Brisbane Ranges, and a uniformly grey-velvety leaf form found on rocky sites at Wilsons Promontory, along the Snowy River gorge and at Point Hicks (Foreman et al. 1993). While *S. parvifolium* is known to hybridise with *S. daltonii* (*S. x ramosissimum*) (Aagesen et al. 2005), possible hybrids with *S. vexilliferum* have also been suggested at the Grampians (Wallaby Rock), near Portland and Anglesea (Foreman et al. 1993). There is also some suggestion that *S. vexilliferum* var. *latifolium* may be a hybrid with *S. parvifolium* (J. Kellerman, pers. comm., 24 Jan 2014).

Fig. 1. *Spyridium parvifolium*. Dandenong Ranges National Park, 4 Sep 2015. Note: 'grande' glabrous green form to the left, hairy grey-green 'molle' (?) form to the right. Ph. C. Clowes.



Aims and objectives

The aims of this study are to investigate:

- the phylogeny of *Spyridium* (with a focus on *S. parvifolium*) using Targeted Amplicon Sequencing techniques;
- morphological variation between individuals of *S. parvifolium* using scored characters;
- nuclear ribosomal DNA (nrDNA) variation within and between populations of *S. parvifolium* using double digestion restriction site-associated DNA sequencing (ddRADseq) loci;
- whole chloroplast DNA (cpDNA) variation between populations of *S. parvifolium* and infer phylogeography; and
- whether ecological niche modelling provides additional insight into the distribution and/or classification of *S. parvifolium*.

Although the Australian Plant Census (Web ref. 2) includes *S. parvifolium* in the broad sense, there is still uncertainty about recognition of varieties or forms of the species. Implications of this uncertainty can be seen most clearly in Tasmania, where currently var. *parvifolium* and var. *molle* are listed as rare under the Threatened Species Protection Act 1995 (Web ref. 3). This listing provides additional protection for the species beyond the state's standard planning requirements for other unlisted indigenous species. One outcome of a comprehensive taxonomic investigation into *S. parvifolium* may be to confirm that formal varieties should not be recognised, which has the potential to pave the way for legislative changes for this species in Tasmania. Conversely this investigation may demonstrate that a number of important forms of the species exist, some or all of which may require protection. This was the case with the recently classified *S. furculentum* W.R.Barker & Kellermann, which was previously included as a form of *S. bifidum* (Kellermann and Barker 2012; Carter & Downe 2006). With the importance of this variation recognised, this species is now listed as Endangered under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999, affording it comprehensive protection at a national level.

Another key aim of my research is to contribute to knowledge of phylogeographic patterns in sclerophyll vegetation of south-eastern Australia. There are few studies of plant phylogeography in this area (Byrne

2008) and nearly all have focused on wet forests of Victoria and Tasmania (Nevill et al. 2014; J.R. Worth et al. 2009, 2010, 2011). *Spyridium parvifolium* is a useful species for investigating the history of sclerophyll vegetation in south-eastern Australia because it is widespread in heathy forests and woodlands and also has substantial disjunctions between some populations, e.g. across Bass Strait and between South Australia and other areas across the lower Murray Basin (Web ref. 1). Similar distributions and disjunctions are also seen in other components of the heathy flora. Data on genetic variation of *S. parvifolium* will provide a useful comparison with the recently published study on *Hardenbergia violacea* (Larcombe et al. 2011) and with other heathland species in *Correa*, *Zieria*, *Philotheca* and *Acacia* currently under investigation by students in our research group, giving insight into common phylogeographic patterns. Of particular interest is the importance of the lower Murray Basin as a barrier to gene flow, the relative importance of western (via the Otways) and eastern (via Wilsons Promontory) connections for gene flow across Bass Strait, and the importance of proposed refugia, such as the Grampians in western Victoria, as reservoirs of genetic diversity. Understanding such patterns of genetic diversity within 'species' can also provide insight into which areas or populations are of higher conservation value.

Eichler Research Fund support

In 2015 I was awarded \$2000 from the Eichler Research Fund to collect populations of *S. parvifolium* in Tasmania.

I completed this field work during October and November of 2015. Five populations of *S. parvifolium* were sampled: two populations from 'mainland' Tasmania (at Sisters Beach and at Bell Bay) and three populations on Flinders Island (Fig. 2; Hines Road, Dutchmans Road and Summers Road). I also attempted to collect from a population at Mt William but despite my best efforts was unable to locate the species. I also managed to collect one or two samples of all other species of *Spyridium* occurring in Tasmania excluding *S. eriocephalum* var. *eriocephalum*.

Current direction

In addition to collecting in Tasmania, I've also had the opportunity to collect *S. parvifolium*

from four populations in South Australia and many more from around Victoria. Since visiting Tasmania I have extracted DNA from the samples collected to date, ready for library preparation and sequencing. This is progressing well; I'm hoping to have sequenced a few whole chloroplasts by the end of the year. In addition I'm hoping to complete a trial of the ddRADseq protocol and Targeted Amplicon Sequencing techniques. I'm completing this investigation on a part time basis; my expected completion date is late 2020.

Acknowledgements

A big thanks to ASBS and the Eichler Research Fund for the financial support to travel to Tasmania for this project. A big thanks also to Mark Wapstra from Ecotas who is a *Spyridium*

enthusiast and provided me with a lot of advice related to where I'd find large populations of *S. parvifolium*. Mark has also been doing extra work since my trip to Tasmania; collecting *spyridiums* from around Hobart to help contribute to my phylogeny. An ongoing thanks to my two supervisors Gillian Brown (Queensland Herbarium) and Michael Bayly (The University of Melbourne) for providing me with guidance when I need it and being very supportive of my part time juggling act. Another ongoing thanks to Juerger Kellermann from Adelaide Botanic Gardens who has provided me with lots of tips about *S. parvifolium* and its allies, and excellent information about

Fig. 2. Below, Collecting samples of *Spyridium parvifolium* on Flinders Island, 2 Nov 2015. Right. *Spyridium parvifolium* found at Hines Road cut back to near ground level; note: glabrous/green var. *parvifolium* in the background, grey/green hairy var. *molle* in the foreground, 30 Oct 2015.

Ph. C. Clowes



where to find it in South Australia. Thanks to Neville Walsh and Frank Udovicic (both from the Royal Botanic Gardens Victoria) for their ongoing support. And one last important thanks to The Holsworth Wildlife Research Endowment of the Equity Trustees Charitable Foundation, who have provided financial support enabling me to complete *S. parvifolium* related fieldwork in South Australia, Victoria and New South Wales.

Can you help?

The main focus of my project is the population study of *S. parvifolium*. However, I'm also hoping to collect fresh material and silica dried samples of all *Spyridium* species from throughout Australia. The latter will (hopefully) enable me to produce a molecular phylogeny of the genus. Extracting DNA from the latter generally produces higher yields useful for next-generation sequencing techniques.

Over the next year I plan to finish collecting *spyridiums* from Victoria, southern NSW and eastern SA but as yet don't have the resources to reach the further and wider *Spyridium* hot spots, especially those in mid and northern NSW, southern WA and the Eyre Peninsula. If you happen to live or work in these areas, or are thinking about heading there in the next year or so, *and* if you think you may have time to collect samples of *Spyridium* please contact me to discuss how you might be able to help.

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Articles

Progress towards a complete key to all Australian vascular plants – Step 1: APC harmonisation of existing KeyBase keys

Kevin Thiele
Eubio Consulting, Perth
<http://eubio.consulting>

With funding from ABRs's Bush Blitz Applied Taxonomy Grants Program, work has started towards an aspirational (and hopefully inspirational) goal – to provide for our users and ourselves a complete key to all Australian vascular plants by 2020. I believe that this is achievable, with sufficient engagement, funding and hard work.

The first steps towards this goal were commenced in 2013, when I began uploading published (and in some cases unpublished) keys to a *Flowering Plants of Australia* project in the then-brand-new KeyBase platform (Web ref. 1). With help from colleagues (see the Contributors¹ tab on the project's Home page), an extraordinary 1439 keys to 15757 taxa (and counting) have been assembled and uploaded, essentially representing all available national-scale dichotomous keys to flowering plants in Australia. An equivalent project for ferns (Web ref. 2) is less complete, but still substantial.

The current ABRs-funded project aims to:

- Harmonise as far as possible all existing keys to the Australian Plant Census (APC). Harmonisation is necessary because the keys were uploaded as published or provided, in many cases with out-of-date nomenclature.
- Update the Key to Families, the core of the key, to remove the first couplet. This couplet separates monocots from dicots, a traditional first step but one that now makes little sense given modern phylogenetic classifications. This first couplet is also immensely frustrating when teaching botany to students; many of us can usually separate a monocot from a 'dicot', but try teaching the knack to a student and it becomes clear how many exceptions there are.
- Add as many keys as achievable in a defined period, concentrating especially on keys to small genera where there is no suitable or

better-qualified available taxonomic expert.

- Facilitate the addition of other keys provided by taxonomists with suitable expertise, where possible.
- Provide ABRs with a fully costed and scoped work-plan for completing the project.

The first two aims are now largely complete. I have compared all taxa in the KeyBase keys with the APC, updating where possible all KeyBase names that don't match an APC name. In all, c. 1440 names have been changed; in most cases, this involved a simple replacement of a synonymous name with the currently accepted APC name. The Key to Families has also been edited and re-uploaded, with the first couplet removed and all monocots re-assigned back into the key. This in essence makes the key fully artificial (artificial keys are almost always easier to use than natural ones).

In addition, the Liliaceae *sensu* Cronquist has been split into its segregate families, and the key to families edited accordingly.

With these changes and updates, it is now possible to assess how complete (or incomplete) the overall project is:

- 400 of 2806 genera of flowering plants recognised in APC are missing from the *Flowering Plants of Australia* project. The keys are thus 86% complete to genus level.
- 417 of the 1602 non-monotypic genera recognised in APC do not yet have a key to species in KeyBase; the project is thus 74% complete at the genus level.
- 10,320 of the 23,376 species recognised in APC are not yet dealt with in the project. The project is thus 56% complete to species level². Of these:
 - 2,124 species have been described or discovered since the key to species in

¹ Joint editors of the project; authors of individual keys are fully cited when the key is viewed.

² This will increase to 60% complete at species level once a new key to *Eucalyptus*, currently being prepared by Dean Nicolle with funding from the Bjarne K. Dahl Trust, is completed and uploaded.

their genus was written; these will need to be added into existing keys.

- 8196 species are to be added in still-to-be-written keys to species (that is, in genera not yet dealt with).

Despite some of these numbers being large, I find this encouraging, and believe that it will be possible to complete a key to all Australian flowering plants within a few years. For example, over half of the 417 genera for which a species key is needed contain five or fewer taxa. These keys should in most cases be relatively straightforward to write. Only 85 missing genera have 20 species or more.

With the release later this year of the ALA's eFlora platform, work will recommence in earnest towards completing the *Flora of Australia*. Keys comprise a central part of the Flora, and the eFlora of Australia project will derive its keys from KeyBase. Completing these keys will be a very significant milestone towards completion of the Flora.

While I have made an attempt to upload and update all available keys to flowering plants in Australia, there may be keys I've missed, or unpublished keys, or keys that could be written with a minimum of effort. The table below lists all genera for which there is currently no key to species in KeyBase. If you have a published or unpublished key to any of these genera, or can quickly write one, please contact me and I'll upload it.

Note also that a project website has been established (Web ref. 3). This will be kept up-to-date, and includes further status reports (such as a listing of all existing KeyBase keys that need one or more taxa added to them). If you would like to contribute to this project, please check out the keys on this site, and contact me if you can help.

Web references

1. <http://keybase.rbq.vic.gov.au/projects/show/1>
2. <http://keybase.rbq.vic.gov.au/projects/show/5>
3. <http://eubio.consulting/projects/proj-fpkeys.html>

Table 1. Genera for which there is currently no available key to Australian species in KeyBase

Family	Genus	Species	Family	Genus	Species	Family	Genus	Species
Acanthaceae	<i>Crossandra</i>	2	Asteraceae	<i>Brachyscome</i>	79	Asteraceae	<i>Taraxacum</i>	9
Acanthaceae	<i>Harnieria</i>	4	Asteraceae	<i>Calocephalus</i>	11	Asteraceae	<i>Tetramolopium</i>	2
Acanthaceae	<i>Justicia</i>	8	Asteraceae	<i>Calotis</i>	30	Asteraceae	<i>Trichocline</i>	2
Acanthaceae	<i>Peristrophe</i>	3	Asteraceae	<i>Celmisia</i>	9	Asteraceae	<i>Trioncinia</i>	2
Acanthaceae	<i>Strobilanthes</i>	2	Asteraceae	<i>Chryscephalum</i>	13	Asteraceae	<i>Vernonia</i>	2
Aizoaceae	<i>Cleretum</i>	2	Asteraceae	<i>Conyza</i>	7	Asteraceae	<i>Wedelia</i>	8
Amaranthaceae	<i>Achyranthes</i>	4	Asteraceae	<i>Cosmos</i>	3	Asteraceae	<i>Xerochrysum</i>	12
Amaranthaceae	<i>Aerva</i>	2	Asteraceae	<i>Craspedia</i>	24	Asteraceae	<i>Zinnia</i>	3
Amaranthaceae	<i>Alternanthera</i>	13	Asteraceae	<i>Cyanthillium</i>	2	Balanophoraceae	<i>Balanophora</i>	2
Amaranthaceae	<i>Prilotus</i>	120	Asteraceae	<i>Dahlia</i>	2	Balsaminaceae	<i>Impatiens</i>	3
Amaryllidaceae	<i>Nerine</i>	4	Asteraceae	<i>Dimorphotheca</i>	5	Begoniaceae	<i>Begonia</i>	2
Anacardiaceae	<i>Rhus</i>	2	Asteraceae	<i>Eclipta</i>	5	Betulaceae	<i>Alnus</i>	2
Anacardiaceae	<i>Toxicodendron</i>	3	Asteraceae	<i>Elephantopus</i>	2	Betulaceae	<i>Betula</i>	2
Aphanopetalaceae	<i>Aphanopetalum</i>	2	Asteraceae	<i>Enydra</i>	2	Bignoniaceae	<i>Campsis</i>	2
Apiaceae	<i>Actinotus</i>	20	Asteraceae	<i>Erechtites</i>	2	Bignoniaceae	<i>Dolichandrone</i>	4
Apiaceae	<i>Bupleurum</i>	5	Asteraceae	<i>Erigeron</i>	11	Bignoniaceae	<i>Handroanthus</i>	2
Apiaceae	<i>Centella</i>	3	Asteraceae	<i>Euchiton</i>	9	Bignoniaceae	<i>Neosepicaea</i>	2
Apiaceae	<i>Eryngium</i>	15	Asteraceae	<i>Eupatorium</i>	2	Bignoniaceae	<i>Pandorea</i>	8
Apiaceae	<i>Lilaeopsis</i>	3	Asteraceae	<i>Ewartia</i>	4	Bignoniaceae	<i>Pithecoctenium</i>	2
Apiaceae	<i>Oenanthe</i>	2	Asteraceae	<i>Felicia</i>	3	Bignoniaceae	<i>Tecoma</i>	3
Apiaceae	<i>Oreomyrrhis</i>	7	Asteraceae	<i>Glossocardia</i>	2	Bignoniaceae	<i>Tecomathe</i>	2
Apiaceae	<i>Oschatzia</i>	2	Asteraceae	<i>Gnephosis</i>	20	Boraginaceae	<i>Cordia</i>	7
Apiaceae	<i>Platysace</i>	29	Asteraceae	<i>Grindelia</i>	2	Boraginaceae	<i>Cynoglossum</i>	4
Apiaceae	<i>Xanthosia</i>	21	Asteraceae	<i>Haekeria</i>	2	Boraginaceae	<i>Echium</i>	6
Apocynaceae	<i>Carissa</i>	2	Asteraceae	<i>Helianthus</i>	5	Boraginaceae	<i>Ehretia</i>	6
Araceae	<i>Xanthosoma</i>	2	Asteraceae	<i>Helichrysum</i>	8	Boraginaceae	<i>Halgania</i>	18
Araliaceae	<i>Astrotricha</i>	25	Asteraceae	<i>Hieracium</i>	3	Boraginaceae	<i>Myosotis</i>	7
Araliaceae	<i>Hydrocotyle</i>	55	Asteraceae	<i>Lagenophora</i>	5	Boraginaceae	<i>Plagiobothrys</i>	5
Araliaceae	<i>Meryta</i>	2	Asteraceae	<i>Minuria</i>	13	Brassicaceae	<i>Alyssum</i>	2
Araliaceae	<i>Polyscias</i>	14	Asteraceae	<i>Montanoa</i>	2	Brassicaceae	<i>Erysimum</i>	2
Arecaceae	<i>Caryota</i>	2	Asteraceae	<i>Odixia</i>	2	Brassicaceae	<i>Heliphila</i>	2
Argophyllaceae	<i>Corokia</i>	2	Asteraceae	<i>Olearia</i>	122	Burmanniaceae	<i>Burmannia</i>	4
Asparagaceae	<i>Hyacinthoides</i>	2	Asteraceae	<i>Osteospermum</i>	2	Campanulaceae	<i>Isotoma</i>	14
Asparagaceae	<i>Yucca</i>	3	Asteraceae	<i>Ozothamnus</i>	56	Campanulaceae	<i>Lobelia</i>	36
Asteraceae	<i>Aster</i>	3	Asteraceae	<i>Podolepis</i>	26	Capparaceae	<i>Crateva</i>	2
Asteraceae	<i>Baccharis</i>	2	Asteraceae	<i>Pycnosorus</i>	6	Caprifoliaceae	<i>Dipsacus</i>	2
Asteraceae	<i>Bidens</i>	6	Asteraceae	<i>Solidago</i>	3	Caprifoliaceae	<i>Lonicera</i>	4
Asteraceae	<i>Blumea</i>	14	Asteraceae	<i>Stevia</i>	2	Caprifoliaceae	<i>Symphoricarpos</i>	2

Family	Genus	Species	Family	Genus	Species	Family	Genus	Species
Caprifoliaceae	<i>Valerianella</i>	5	Ericaceae	<i>Leucopogon</i>	262	Loganiaceae	<i>Geniostoma</i>	3
Caprifoliaceae	<i>Viburnum</i>	2	Ericaceae	<i>Melichrus</i>	12	Lythraceae	<i>Cuphea</i>	2
Caryophyllaceae	<i>Colobanthus</i>	10	Ericaceae	<i>Monotoca</i>	12	Malpighiaceae	<i>Stigmaphyllon</i>	4
Celastraceae	<i>Hedraianthera</i>	2	Ericaceae	<i>Pentachondra</i>	4	Malvaceae	<i>Abelmoschus</i>	3
Celastraceae	<i>Tripterococcus</i>	3	Ericaceae	<i>Rhododendron</i>	2	Malvaceae	<i>Abutilon</i>	38
Centrolepidaceae	<i>Gaimardia</i>	3	Ericaceae	<i>Sphenotoma</i>	7	Malvaceae	<i>Alyogyne</i>	12
Chenopodiaceae	<i>Bassia</i>	2	Ericaceae	<i>Sprengelia</i>	7	Malvaceae	<i>Dicarpidium</i>	7
Cistaceae	<i>Cistus</i>	5	Ericaceae	<i>Syphelia</i>	17	Malvaceae	<i>Gossypium</i>	20
Clusiaceae	<i>Calophyllum</i>	6	Ericaceae	<i>Trochocarpa</i>	8	Malvaceae	<i>Helicteres</i>	28
Clusiaceae	<i>Mammea</i>	2	Eriocaulaceae	<i>Eriocaulon</i>	38	Malvaceae	<i>Hibiscus</i>	87
Clusiaceae	<i>Mesua</i>	2	Erythroxylaceae	<i>Erythroxylum</i>	6	Malvaceae	<i>Lagunaria</i>	2
Combretaceae	<i>Combretum</i>	2	Euphorbiaceae	<i>Euphorbia</i>	73	Malvaceae	<i>Lasiopetalum</i>	50
Commelinaceae	<i>Aneilema</i>	6	Fabaceae	<i>Acaciella</i>	3	Malvaceae	<i>Malachra</i>	2
Commelinaceae	<i>Callisia</i>	2	Fabaceae	<i>Aotus</i>	25	Malvaceae	<i>Malva</i>	13
Commelinaceae	<i>Cartonema</i>	9	Fabaceae	<i>Arachis</i>	2	Malvaceae	<i>Malvastrum</i>	2
Commelinaceae	<i>Commelina</i>	15	Fabaceae	<i>Austrodolichos</i>	3	Malvaceae	<i>Melhanina</i>	3
Commelinaceae	<i>Murdannia</i>	7	Fabaceae	<i>Bossiaea</i>	84	Malvaceae	<i>Pavonia</i>	3
Commelinaceae	<i>Tradescantia</i>	5	Fabaceae	<i>Cajanus</i>	18	Malvaceae	<i>Sida</i>	99
Convolvulaceae	<i>Argyria</i>	2	Fabaceae	<i>Callerya</i>	5	Malvaceae	<i>Sterculia</i>	4
Convolvulaceae	<i>Bonamia</i>	15	Fabaceae	<i>Callistachys</i>	2	Malvaceae	<i>Thespesia</i>	3
Convolvulaceae	<i>Jacquemontia</i>	12	Fabaceae	<i>Calopogonium</i>	2	Malvaceae	<i>Thomasia</i>	44
Convolvulaceae	<i>Polymnia</i>	11	Fabaceae	<i>Chorizema</i>	25	Marantaceae	<i>Thalia</i>	2
Crassulaceae	<i>Kalanchoe</i>	3	Fabaceae	<i>Cynometra</i>	3	Meliaceae	<i>Vavaea</i>	2
Crassulaceae	<i>Sedum</i>	10	Fabaceae	<i>Derris</i>	6	Menyanthaceae	<i>Liparophyllum</i>	8
Cucurbitaceae	<i>Cucurbita</i>	2	Fabaceae	<i>Dillwynia</i>	36	Menyanthaceae	<i>Nymphoides</i>	22
Cucurbitaceae	<i>Zehneria</i>	2	Fabaceae	<i>Dunbaria</i>	3	Menyanthaceae	<i>Ornduffia</i>	7
Cunoniaceae	<i>Caldcluvia</i>	3	Fabaceae	<i>Flemingia</i>	7	Molluginaceae	<i>Mollugo</i>	4
Cunoniaceae	<i>Geissois</i>	2	Fabaceae	<i>Galactia</i>	10	Moraceae	<i>Artocarpus</i>	3
Cunoniaceae	<i>Gillbeea</i>	2	Fabaceae	<i>Hardenbergia</i>	4	Myodocarpaceae	<i>Delarbrea</i>	2
Cyperaceae	<i>Actinoschoenus</i>	7	Fabaceae	<i>Hovea</i>	45	Myrtaceae	<i>Actinodium</i>	2
Cyperaceae	<i>Baumea</i>	17	Fabaceae	<i>Isotropis</i>	15	Myrtaceae	<i>Beaufortia</i>	20
Cyperaceae	<i>Bulbostylis</i>	8	Fabaceae	<i>Kenmedia</i>	15	Myrtaceae	<i>Callistemon</i>	48
Cyperaceae	<i>Carex</i>	67	Fabaceae	<i>Latrobea</i>	9	Myrtaceae	<i>Darwinia</i>	72
Cyperaceae	<i>Carpha</i>	4	Fabaceae	<i>Mirbelia</i>	39	Myrtaceae	<i>Decaspermum</i>	2
Cyperaceae	<i>Caustis</i>	8	Fabaceae	<i>Phyllota</i>	10	Myrtaceae	<i>Harmogia</i>	2
Cyperaceae	<i>Chorizandra</i>	5	Fabaceae	<i>Psoralea</i>	2	Myrtaceae	<i>Hypocalymma</i>	32
Cyperaceae	<i>Cladium</i>	2	Fabaceae	<i>Rhynchosia</i>	6	Myrtaceae	<i>Kunzea</i>	57
Cyperaceae	<i>Crosslandia</i>	2	Fabaceae	<i>Sesbania</i>	12	Myrtaceae	<i>Metrosideros</i>	4
Cyperaceae	<i>Cyathochaeta</i>	6	Fabaceae	<i>Tephrosia</i>	128	Ochnaceae	<i>Brackenridgea</i>	2
Cyperaceae	<i>Cyperus</i>	152	Fabaceae	<i>Urodon</i>	4	Oleaceae	<i>Chionanthus</i>	4
Cyperaceae	<i>Eleocharis</i>	37	Fabaceae	<i>Vigna</i>	21	Oleaceae	<i>Fraxinus</i>	5
Cyperaceae	<i>Fimbristylis</i>	120	Geraniaceae	<i>Geranium</i>	29	Oleaceae	<i>Jasminum</i>	17
Cyperaceae	<i>Gahnia</i>	31	Geraniaceae	<i>Pelargonium</i>	18	Oleaceae	<i>Ligustrum</i>	6
Cyperaceae	<i>Gymnoschoenus</i>	2	Goodeniaceae	<i>Brunonia</i>	3	Oleaceae	<i>Notelaea</i>	14
Cyperaceae	<i>Hypolytrum</i>	2	Grossulariaceae	<i>Ribes</i>	3	Orobanchaceae	<i>Orobancha</i>	3
Cyperaceae	<i>Isolepis</i>	31	Heliconiaceae	<i>Heliconia</i>	2	Oxalidaceae	<i>Oxalis</i>	32
Cyperaceae	<i>Lepidosperma</i>	107	Hypericaceae	<i>Hypericum</i>	18	Paracryphiaceae	<i>Quintinia</i>	4
Cyperaceae	<i>Oreobolus</i>	7	Iridaceae	<i>Babiana</i>	4	Pedaliaceae	<i>Josephinia</i>	5
Cyperaceae	<i>Rhynchospora</i>	21	Iridaceae	<i>Diets</i>	3	Pennantiaceae	<i>Pennantia</i>	2
Cyperaceae	<i>Schoenoplectus</i>	12	Juncaceae	<i>Juncus</i>	74	Phrymaceae	<i>Glossostigma</i>	6
Cyperaceae	<i>Schoenus</i>	109	Juncaceae	<i>Luzula</i>	16	Phrymaceae	<i>Mimulus</i>	9
Cyperaceae	<i>Scleria</i>	33	Lamiaceae	<i>Ajuga</i>	4	Phrymaceae	<i>Peplidium</i>	10
Cyperaceae	<i>Tetraria</i>	10	Lamiaceae	<i>Anisomeles</i>	4	Phyllanthaceae	<i>Breynia</i>	3
Cyperaceae	<i>Tricostularia</i>	7	Lamiaceae	<i>Hemianthera</i>	14	Phyllanthaceae	<i>Glochidion</i>	17
Cyperaceae	<i>Uncinia</i>	12	Lamiaceae	<i>Hemigenia</i>	65	Phyllanthaceae	<i>Phyllanthus</i>	65
Dilleniaceae	<i>Hibbertia</i>	272	Lamiaceae	<i>Hyptis</i>	4	Phyllanthaceae	<i>Sauropus</i>	37
Dilleniaceae	<i>Tetracera</i>	2	Lamiaceae	<i>Lavandula</i>	3	Plantaginaceae	<i>Adenosma</i>	2
Elaeagnaceae	<i>Elaeagnus</i>	2	Lamiaceae	<i>Leonotis</i>	2	Plantaginaceae	<i>Linaria</i>	7
Elaeocarpaceae	<i>Aristotelia</i>	2	Lamiaceae	<i>Leonurus</i>	2	Plantaginaceae	<i>Plantago</i>	37
Elaeocarpaceae	<i>Elaeocarpus</i>	34	Lamiaceae	<i>Mentha</i>	13	Plantaginaceae	<i>Stemodia</i>	17
Elaeocarpaceae	<i>Platytheca</i>	4	Lamiaceae	<i>Microcorys</i>	27	Plantaginaceae	<i>Veronica</i>	37
Ericaceae	<i>Acrotriche</i>	19	Lamiaceae	<i>Plectranthus</i>	58	Plumbaginaceae	<i>Limonium</i>	10
Ericaceae	<i>Andersonia</i>	43	Lamiaceae	<i>Prostanthera</i>	116	Plumbaginaceae	<i>Plumbago</i>	2
Ericaceae	<i>Archeria</i>	5	Lamiaceae	<i>Salvia</i>	12	Poaceae	<i>Brachypodium</i>	2
Ericaceae	<i>Astroloma</i>	31	Lamiaceae	<i>Stachys</i>	5	Poaceae	<i>Calamagrostis</i>	2
Ericaceae	<i>Brachyloma</i>	17	Lamiaceae	<i>Teucrium</i>	23	Poaceae	<i>Chionochloa</i>	2
Ericaceae	<i>Conostephium</i>	11	Lamiaceae	<i>Westringia</i>	30	Poaceae	<i>Cynochloris</i>	2
Ericaceae	<i>Dracophyllum</i>	7	Linderniaceae	<i>Buchnera</i>	7	Poaceae	<i>Leptochloa</i>	9
Ericaceae	<i>Epacris</i>	46	Linderniaceae	<i>Centranthera</i>	2	Poaceae	<i>Leymus</i>	2
Ericaceae	<i>Erica</i>	29	Linderniaceae	<i>Lindernia</i>	45	Poaceae	<i>Piptochaetium</i>	2
Ericaceae	<i>Gaultheria</i>	6	Linderniaceae	<i>Striga</i>	4	Poaceae	<i>Rottboellia</i>	2

Family	Genus	Species	Family	Genus	Species	Family	Genus	Species
Polemoniaceae	<i>Collomia</i>	2	Restionaceae	<i>Sporadanthus</i>	6	Rubiaceae	<i>Randia</i>	5
Polygalaceae	<i>Comesperma</i>	29	Rhamnaceae	<i>Cryptandra</i>	57	Rubiaceae	<i>Spermacoce</i>	96
Polygonaceae	<i>Duma</i>	3	Rhamnaceae	<i>Spyridium</i>	46	Rutaceae	<i>Agathosma</i>	2
Polygonaceae	<i>Muehlenbeckia</i>	14	Rosaceae	<i>Acaena</i>	9	Rutaceae	<i>Geleznovia</i>	4
Polygonaceae	<i>Persicaria</i>	18	Rosaceae	<i>Aphanes</i>	4	Rutaceae	<i>Murraya</i>	2
Polygonaceae	<i>Polygonum</i>	6	Rosaceae	<i>Cotoneaster</i>	12	Sapindaceae	<i>Lepisanthes</i>	2
Polygonaceae	<i>Rumex</i>	20	Rosaceae	<i>Crataegus</i>	6	Sapindaceae	<i>Tristiropsis</i>	2
Pontederiaceae	<i>Heteranthera</i>	2	Rosaceae	<i>Photinia</i>	2	Sapotaceae	<i>Niemeyera</i>	5
Portulacaceae	<i>Anacampseros</i>	2	Rosaceae	<i>Potentilla</i>	10	Sapotaceae	<i>Planchonella</i>	17
Portulacaceae	<i>Calandrinia</i>	67	Rosaceae	<i>Prunus</i>	17	Sapotaceae	<i>Pouteria</i>	7
Portulacaceae	<i>Portulaca</i>	23	Rosaceae	<i>Pyracantha</i>	6	Sapotaceae	<i>Sersalisia</i>	3
Portulacaceae	<i>Sedopsis</i>	5	Rosaceae	<i>Pyrus</i>	3	Scrophulariaceae	<i>Buddleja</i>	6
Portulacaceae	<i>Talinum</i>	2	Rosaceae	<i>Rhaphiolepis</i>	2	Scrophulariaceae	<i>Maurandya</i>	2
Primulaceae	<i>Lysimachia</i>	8	Rosaceae	<i>Rosa</i>	13	Scrophulariaceae	<i>Scrophularia</i>	2
Primulaceae	<i>Samolus</i>	8	Rosaceae	<i>Rubus</i>	35	Scrophulariaceae	<i>Verbascum</i>	5
Ranunculaceae	<i>Anemone</i>	3	Rosaceae	<i>Sorbus</i>	2	Solanaceae	<i>Brugmansia</i>	2
Restionaceae	<i>Chordifex</i>	21	Rosaceae	<i>Spiraea</i>	5	Solanaceae	<i>Lycianthes</i>	2
Restionaceae	<i>Dapsilanthus</i>	3	Rubiaceae	<i>Amaracarpus</i>	2	Stylidiaceae	<i>Levenhookia</i>	11
Restionaceae	<i>Desmocladius</i>	15	Rubiaceae	<i>Coelospermum</i>	4	Stylidiaceae	<i>Stylidium</i>	282
Restionaceae	<i>Hypolaena</i>	8	Rubiaceae	<i>Dentella</i>	9	Tamaricaceae	<i>Tamarix</i>	5
Restionaceae	<i>Lepidobolus</i>	9	Rubiaceae	<i>Gardenia</i>	20	Thymelaeaceae	<i>Wikstroemia</i>	2
Restionaceae	<i>Leptocarpus</i>	3	Rubiaceae	<i>Knoxia</i>	2	Ulmaceae	<i>Ulmus</i>	5
Restionaceae	<i>Lepyrodia</i>	27	Rubiaceae	<i>Morinda</i>	10	Violaceae	<i>Melicytus</i>	6
Restionaceae	<i>Loxocarya</i>	5	Rubiaceae	<i>Opercularia</i>	18	Vitaceae	<i>Vitis</i>	2
Restionaceae	<i>Meeboldina</i>	11	Rubiaceae	<i>Pomax</i>	4			
Restionaceae	<i>Onychosepalum</i>	3	Rubiaceae	<i>Psychotria</i>	19			

News

Summer scholarships at the State Herbarium of SA

Two University of Adelaide undergraduate students from the School of Biological Sciences, Jessica Burdon and Sarah Harvey, spent the long break working on projects at the State Herbarium (Web ref.). Jessica spent time working on the *Carpobrotus* project resulting from Hellmut Toelken's recognition of a weedy invasive hybrid. This project has involved herbarium staff along with Adelaide & Mt Lofty Ranges Natural Resource Management and Birdlife Australia.

Sarah worked firstly with Carolyn Ricci of the algal group on a rescue operation of those red algae which produce caragenans, used as thickening agents. These specimens gradually break down after preservation and eventually degrade themselves, the paper they are mounted on and other things which may be in contact with them. She then assisted Graham Bell in a project documenting the occurrence of an introduced liverwort, *Sphaerocarpos*, in South Australia.

Web ref. <http://know.ourplants.org/news/summer-scholarships/>

New eNews for Fungimap

Fungimap has started a new on-line news publication to communicate more regularly with anyone interested in fungi. They plan on publishing *Fungimap eNews* from time to time and it will be free. Their first issue and details of how to subscribe can be found on-line (Web ref.).

Web ref. <http://eepurl.com/bVYjmf>

Rare fairy circles

Unfortunately you will need a subscription to read the original paper on the "fairy" circles of the Pilbara region of Western Australia (Getzin et al. 2016), but there has been much coverage in the news of these fascinating phenomena, once thought only to occur in Namibia (Web refs. 1-3). All of the articles are accompanied by wonderful photographs as well.

References

Getzin, S., Yizhaq, H., Bell, B., Erickson, T.E., Postle, A.C., Katra, I., Tzuk, O., Zelnik, Y.R., Wiegand, K., Wiegand, T. & Meron, E. (2016). Discovery of fairy circles in Australia supports self-organization theory. PNAS 113 (13): 3551-3556. DOI10.1073/pnas.1522130113 www.pnas.org/content/113/13/3551.abstract

Web ref. 1. www.abc.net.au/news/2016-03-15/fairy-circles-discovered-in-australian-outback/7245736

Web ref. 2. www.theaustralian.com.au/higher-education/out-of-africa-mystery-fairy-circles-found-in-vests-red-soil/news-story/cee917bb2028e47e49c2383132828b35

Web ref. 3. www.theatlantic.com/science/archive/2016/03/mysterious-fairy-circles-australia-namibia/473625/

Seeking international agreement on what is “native”

Another paper seeking a workable universal definition of the term “native” for legislative purposes.

Reference

Gilroy, J.J., Avery, J.D. & Lockwood, J.L. (2016). Seeking international agreement on what it means to be ‘native’. *Conservation Letters*, 10 pp. <http://onlinelibrary.wiley.com/doi/10.1111/conl.12246/epdf>

Systematics: the future?

A recent paper by Wen et al. (2015) neatly summarises all of the advances that have been made surrounding natural history collections in the last 10-20 years while also looking to the future, a subject addressed by Vicki Funk at the last conference in Canberra.

Reference

Wen, J., Ickert-Bond S.M., Appelhans, M.S., Dorr, L.J. & Funk, V.A. (2015). Collections-based systematics: opportunities and outlook for 2050. *Journal of Systematics and Evolution* 53: 477-488. <http://onlinelibrary.wiley.com/doi/10.1111/jse.12181/abstract;jsessionid=703A8B3BEAAE465296B4E114B56E1238.f03t04>

Taxonomy Appreciation Day March 19th 2016

Mark this day in your diary for future reference. Taxonomist Appreciation Day was 4 years old on March 19th and was first proposed by an ant ecologist, Terry McGlynn, in recognition of an ant systematist (Web ref. 1). It has been proposed as a day when other people show appreciation for the work of taxonomists but in the absence of anyone knocking on our door to do so we marked the occasion at AD and patted ourselves on the back. How did others mark the occasion? See Web references 2 to 4.

Web references

- 1: <https://smallpondscience.com/2014/03/19/today-is-taxonomist-appreciation-day/>
- 2: www.biodiversityinfocus.com/blog/2014/03/20/

[taxonomy-activity-on-taxonomist-appreciation-day/](http://www.biodiversityinfocus.com/blog/2014/03/20/taxonomy-activity-on-taxonomist-appreciation-day/)

3: <http://buzzhootroar.com/>

4: <http://echinoblog.blogspot.com.au/2016/03/taxonomy-day-2016-museum-collections.html>

Italy celebrates International Women’s Day

In Italy, International Women’s Day is celebrated on a particular date, March 8th, by the giving of bunches of mimosa flowers. *Mimosa* was chosen as the symbol for the day because the French symbols, violets and lily-of-the-valley, were too scarce and expensive in Italy (Web refs. 1, 2). *Mimosa* is also apparently one of the most common presents in Russia and eastern Europe. And the *Mimosa* is of course none other than Australian *Acacia* species, often *A. dealbata*, though other species are used as well. These are the same species used in Mimosa festivals held throughout the Mediterranean region at the same time of the year, as previously noted in our pages (Barker 2006).

References

Barker, R.M. (2006). Floral floats and flower battles – Australian acacia under another name. *ASBS Newsletter* 128: 15-17

Web ref. 1: www.theflorentine.net/lifestyle/2010/02/teresa-mattei/

Web ref. 2: www.lifeinitaly.com/culture/women-day

Can *Solanum* sp. *Bullita* (P.K.Latz 14752) live up to its formal name?

Solanum sp. *Bullita* (P.K.Latz 14752) is henceforth to be known as *S. watneyi* Martine & Frawley (Martine et al. 2016):

The specific epithet of “watneyi” is inspired by the book and film, *The Martian*, in which the protagonist finds himself stranded on Mars surrounded by the planet’s harsh terrain and reddish soils. In a shelter, he manages to grow a crop of potatoes (*Solanum tuberosum*) before finally being rescued by his astronaut colleagues. We’ve chosen to name *Solanum watneyi* after this character, Mark Watney, in part because of the similarly reddish soils of its habitat and the congeneric nature of the potato – but, most notably, as a way to honor the creation of a sci-fi hero botanist by author Andy Weir (Weir 2013)

and to acknowledge perhaps the finest paean to botanical science (and botanical field work) that Hollywood has yet presented (Martine 2015).

Its publication has coincided with the release of the film and also the Oscar ceremony and has attracted attention in the media.

References

- Martine, C.T., E.S. Frawley, J.T. Cantley and I.E. Jordan-Thaden. (2016). *Solanum watneyi*, a new bush tomato species from the Northern Territory, Australia named for Mark Watney of the book and film "The Martian." *PhytoKeys* 61: 1-13. doi: 10.3897/phytokeys.61.6995. http://phytokeys.pensoft.net/articles.php?id=6995&display_type=list&element_type=2
- Martine, C.T. (2015). Why I'm Naming a New Species after The Martian. Huffington Post 28 September 2015. www.huffingtonpost.com/dr-chris-martine/why-im-naming-a-new-plant_b_8190242.html
- Weir, A. (2013). *The Martian*. Published by the author [later published in 2014 by Crown Publishing Group, New York]

Stay on 2017 NSF funding for collections management

It was dispiriting to read that the US National Science Foundation (NSF) programme which funds work on the curation of Natural History collections in the United States has been put on hold for 2017.

The Collections in Support of Biological Research (CSBR) Program is not accepting new project proposals in 2016 for Fiscal Year 2017 by the NSF's Directorate for Biological Sciences.

During this time, the programme has been asked to evaluate its importance in the research and education community. As part of this evaluation feedback is being sought from any stakeholders, including individuals, institutions, and professional societies.

Hopefully this evaluation means that there will be a proper assessment of the use of these collections, their importance realised, and even better, or more focussed funding will result. As you would expect, the subject has been raised in the media (Web refs. 1-4) in various ways, and it is interesting to note (Web ref. 2) that two other programmes, one supporting digitisation of specimens and the other supporting young researchers using biological collections, have not been cut. Does this mean that research of the future is envisaged to only be on digitised specimens?

Web references

- 1: www.nature.com/news/biological-specimen-treasures-threatened-by-funding-pause-1.19599?WT.mc_id=TWT_NatureNews
- 2: www.sciencemag.org/news/2016/03/biologists-ask-nsf-reconsider-plan-pause-collections-funding-program
- 3: www.theatlantic.com/science/archive/2016/03/funding-freeze-hits-natural-history-museum-collections/474981/
- 4: <http://mikethemadbiologist.com/2016/03/22/we-need-to-restore-nsfs-biological-collections-program/>

Robyn Barker

Web sites of interest

The Allan Cunningham Project

Tony Orchard has drawn attention to a number of books (see p. 42) published by John Whitehead on Allan Cunningham. The Allan Cunningham Project web page, through which these books can be purchased, is dedicated to Cunningham and is a mine of further information. It includes a time line of Cunningham's life, a series of articles by the editor of the page, Diane Challenor, a plant index and links to all of the books published about him. Robert Heward's biographical sketch of Cunningham of 1842 is amongst these, as of course are some of Tony and Tessa Orchard's own impressive array of

works on this subject. How different from the early 1980s when the McMinn biography was viewed as the last word on this botanist and explorer!

References

- McMinn, W.G. (1970). *Allan Cunningham: Botanist and Explorer*. (Melbourne University Press)
- Web ref.: http://artuccino.com/Allan_Cunningham_Botanist_1839/

Ludwig Leichhardt writes home

The virtual exhibition entitled *Ludwig Leichhardt: A German Explorer's Letters Home* from Australia consists of 17 letters that

Leichhardt sent from Australia to his relatives between 23 March 1842 and 22 February 1848. The letters, held by the Deutsches Museum in Munich, are the centrepiece to the exhibition. Each of the letters has been digitised so that one can see the original in its entirety, but even better, they also have an English translation. The site deals with his botanical and zoological collections as well as comments on his gleanings of indigenous knowledge, to which Rod Fensham (one of the translators of his diaries) has contributed. Interestingly 3 of his collections are depicted from the herbarium in Berlin, where many collections did not survive World War II bombings; perhaps more will be revealed with time. A search of the German Virtual Herbarium site (Web ref.) only indicated a single Leichhardt type collection in the University of Graz herbarium (GZU) and none for Berlin (B).

The texts on the site are by Heike Hartmann and she is to be congratulated on an exemplary website.

References

- Hartmann, Heike (2015). Ludwig Leichhardt: a German explorer's letters home from Australia. Commentaries translated by Brenda Black. *Environment & Society Portal, Virtual Exhibitions* 2015, no. 1. Rachel Carson Center for Environment and Society. www.environmentandsociety.org/node/6348.
- Darragh, T.A & Fensham, R.J. (eds). (2013). *The Leichhardt diaries: early travels in Australia during 1842–1844*. (Queensland Museum: South Brisbane, Qld.).
- Web ref.: <http://herbarium.univie.ac.at/database/search.php>

Environmental Weeds of Australia via LucidMobile

Environmental Weeds of Australia is available as an ID App! It is based on an updated edition of the earlier CD version and includes the full identification key, weed fact sheets, and over 10,000 images, all on your smart device. An internet connection is not required once installed, but note that this is a large download (272Mb).

There are two versions:

- Android: cost \$A9:90
<https://play.google.com/store/apps/details?id=org.lucidcentral.mobile.ewa&hl=en>

- Ios: –cost - \$A10:99

<https://itunes.apple.com/au/app/environmental-weeds-australia/id898685476?mt=8>

PowerPoint

PowerPoint: love it, hate it, deride it, but where would we be without it? But are we using it effectively? Could we do better? Should we be able to deliver a presentation without it? What do you do if your presentation doesn't appear when presenting at a conference? ASBS conference presentations have surely improved since its inception but could we do better? Some differing points of view are expressed in the following links.

Web references

- <https://www.timeshighereducation.com/opinion/in-praise-of-microsoft-powerpoint>
- <https://www.timeshighereducation.com/blog/learning-live-without-powerpoint>
- <https://www.timeshighereducation.com/comment/opinion/for-lecturers-there-is-life-beyond-death-by-powerpoint/2014524.article>

Charles Chapman, botanical collector

Mike Crisp provides a background and personal appreciation of Charles Chapman, farmer, conservationist and collector of the northern sandplains area of Western Australia in the latest issue of the Society of Australian Systematic Biologists' newsletter *Banksia*.

References

- Crisp, M (2016). Charles Chapman (1904–1989) an unsung enthusiast, conservationist and collector of rare plants from a Western Australian hotspot of floristic diversity. *Banksia* 12: 16–18. www.sasb.org.au/banksia/Banksia_12_Mar_2016.pdf

Images of Berlin specimens

In 1929, J. Francis Macbride, funded by the Rockefeller Foundation, travelled to Europe to photograph herbarium specimens of nomenclatural types for the Field Museum of Natural History in Chicago. The intent was to make the photographs available to American botanists who were unable to finance travels to European herbaria since the loan process was not as fully developed as it is today. Over the next 10 years MacBride photographed type specimens of tropical American plants at B, C, HAN, HBG, MA, P and W resulting in 40,000

photographic negatives. Duplicate collections, types and type fragments of authentic material were also selected and sent to the Field Museum as exchange.

As a result there does still exist information and often a black and white image of many type specimens collected in Central and South America between 1778 and May 1930 which no longer exist in the herbarium in Berlin. Digitisation of the Berlin negatives at the Field Museum occurred from 2004 to 2007 and these are available through a searchable website at the Web reference below.

While the site is of tropical American species there are occasional oddities such as a garden

collection of the Australian species, *Nicotiana suaveolens*, probably received from Hortus Malmaison, the home of Napoleon and Josephine.

Further information about the project and the type photographs at the Field Museum can be found in two more or less identical papers (Grimé & Plowman, 1986, 1987).

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Web ref.: http://emuweb.fieldmuseum.org/botany/search_berlin.php

Robyn Barker

ABRS report

Staff updates

Dr Judy West returns to her role as Assistant Secretary for Parks Island and Biodiversity Science Branch and Executive Director of Australian National Botanic Gardens on 4 April 2016.

ABRS is currently seeking a Taxonomy - Scientific Team Leader (see Web ref.).

Flora of Australia and the Australasian eFlora platform

Progress continues on the development of an Australasian eFlora platform, in partnership with CHAH and the Atlas of Living Australia. Platform developments are being informed by feedback received during a testing program in 2015. Representatives involved in the testing program may be contacted to check whether identified issues have been resolved.

Grants

In early January, the Minister approved funding for 21 research and capacity-building projects under the 2016-17 round of the National Taxonomy Research Grant Program (NTRGP). The ABRS is currently working with successful applicants to execute funding agreements and confirm project activity.

The Student Travel Grants funding stream of the NTRGP will again be open for applications in early April. More information will be available on the Department's website, when the round opens.

Bush Blitz

Recent expeditions: February 2016 - two expeditions were held in Tasmania, one in the South West National Park and the other on Bruny Island. The South West National Park expedition included expertise from the Tasmanian Museum and Art Gallery, Queensland Museum, and the University of NSW. The Bruny Island Expedition included expertise from the Tasmanian Museum and Art Gallery, Queensland Museum, the Tasmanian Seed Conservation Centre and the University of NSW. This expedition also involved five science teachers from around Australia participating in the Bush Blitz TeachLive project. This was also the first Bush Blitz to undertake zoological and marine algae collection in the intertidal zone and using a small boat scoop in partnership with the Woodbridge Marine Discovery Centre.

Upcoming planned expeditions include: June 2016 - Islands of the Coral Sea Commonwealth Marine Reserve in partnership with the Marine Protected Areas Branch of Parks Australia who are conducting a marine debris survey and clean-up. This expedition will include botanical collections, terrestrial invertebrates and marine invertebrates living on marine debris. Two science teachers will also be involved in this expedition as part of a mini-Bush Blitz Teachlive pilot.

Web ref.: <http://www.environment.gov.au/about-us/employment>

Zoe Knapp
March 2016

Exhibitions

Where science meets art: the botanical illustrations of Rod Seppelt

^aAlison Downing and ^bLyn Cave

^a Department of Biological Sciences, Macquarie University, NSW, 2109

^bTasmanian Herbarium, University of Tasmania, College Road, Sandy Bay, Tas., 7005

***Tasmanian Museum and Art Gallery
Dunn Place, Hobart
22nd January 2016 to 1st May 2016***

Rod Seppelt, as a high school student, never intended to study botany, and instead pursued other interests, particularly the study of birds. He eventually completed a degree majoring in both zoology and botany at the University of Adelaide. In Australia, Rod is well known for his studies of bryophytes and lichens in Antarctica and on many sub-Antarctic Islands. However, from time to time, he switched from bitterly cold southern climes to distant lands of North America, principally Alaska, where his research and publications have included not only bryophytes, but also extended to fungi, lichens, algae and slime moulds.

In recent years there has been a resurgence of interest in botanical illustration but for most of us, and the community in general, the words botanical illustration bring to mind charming, elegant and often beautifully coloured drawings and paintings of vascular plants. However, Rod's studies in both the Antarctic and Arctic, have, of necessity, been of miniature plants and he

has not only studied the mosses, liverworts, lichens, fungi and algae of climatic extremes, he has created an extensive portfolio of beautifully intricate scientific illustrations to accompany his scientific publications. His illustrations

are not only exquisite but drawn with such accuracy that they have become an essential tool in the identification of this miniature flora.

The Tasmanian Museum and Art Gallery recently hosted an exhibition of Rod's work (Fig. 1), drawn from bryophyte specimens in the Tasmanian Herbarium (HO), many collected by Rod himself while undertaking scientific studies in Antarctica, on subantarctic islands and in Tasmania. Janet Carding, Director of the Tasmanian Museum and Art Gallery, spoke at the opening of the exhibition on 22nd January, 2016:

The Tasmanian Museum and Art Gallery is delighted to be hosting this exhibition –

believed to be one of very few, if not the first exhibition of botanical art devoted entirely to mosses held anywhere in the world. Botanical illustrations record accurately all the features that are necessary for plant identification, including the plant's overall appearance and structure. Such illustrations have been used to



Fig. 1. Rod Seppelt at the opening of the exhibition, *Where Science Meets Art, the Botanical Illustrations of Rod Seppelt*, at the Tasmanian Museum and Art Gallery, Hobart, Tasmania

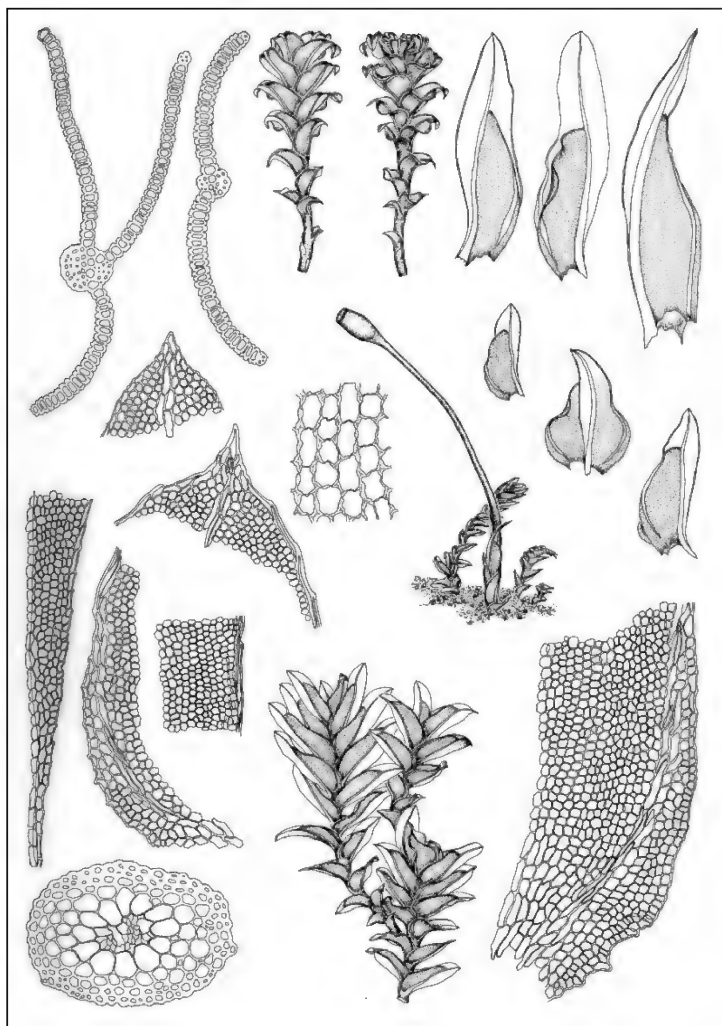


Fig. 2. *Fissidens megalotis* drawn from 3 specimens collected from: Talarook (I.G.Stone 9330, undated, MEL 2216515), Glenorchy, near Elwick (W.A.Weymouth 2834, 24 Jul 1901, HO 73490), and north of Yass, by I.G.Stone 21684, undated, MEL 2261953).

Artist: Rod Seppelt,
with permission.

illustrations specifically for their own taxonomic studies. Bryophytes are, for the most part, extremely small when compared to vascular plants, and the skill required to accurately reproduce on one page an image not just of the whole plant, which may be only a millimetre or two tall, but also of leaves, stems, propagules, sporophytes, spores and sections of many of these components, is awesome. Each one of Rod's illustrations invariably includes a habit study, entire stem leaves and perichaetial leaves (often modified leaves that subtend the spore-bearing capsules), detailed patterns of cells in leaves and leaf margins, transverse sections of stems and leaves, sporophyte including seta, capsule, calyptra and operculum, all at different

scales on the one page, arranged with simple elegance, each one a remarkable achievement (e.g. Figs. 2, 3).

The process required to combine scientifically accurate morphology and anatomy of bryophytes in an aesthetically pleasing illustration is quite complex and involves first moistening plants for many hours, drawing detailed habit studies, then dissecting stems and leaves, cutting thin sections, and use of both binocular dissecting and compound microscopes fitted with camera lucida drawing attachments, and ultimately composing and inking completed plates onto polyester film. In Rod's words:

Scientific illustration should include not only an accurate representation of the subject plant, but also include all the necessary detail to enable unequivocal identification.

identify plants since the times of the ancient herbals, and to this day, botanical illustrations accompany and enhance written, often highly technical descriptions, help us to recognise and identify plants, and to communicate effectively about them. It is one medium that has certainly not been superseded by the digital world.

Rod's generosity is well known to his Australian colleagues and to many overseas, not only in north America, but also in Europe, Japan and more recently in China. However, he has not only readily advised and assisted many colleagues with their research, he has made his illustrations of Australian mosses freely available to all, either directly or through the Australian Mosses Online website (Web ref.). He has assisted many by creating bryophyte

The exhibition is designed around four main groups of illustrations: 'Mosses of Tasmanian Bushland', including, appropriately, *Tayloria gunnii* (Tasmanian endemic) and *T. tasmanica* (known only from Tasmania and recently found on Stewart Island in New Zealand); 'Mosses from Macquarie Island', including three elusive Pottiaceae; 'Illustrations for the *Flora of Australia*', with illustrations of four *Fissidens* species; and a wonderful category, 'Botanical Art to Hang on a Fireplace Wall'!

Botanists Matt Baker and Lyn Cave from the Tasmanian Herbarium were the instigators of this exhibition which they felt would focus attention on the more than 35,000 botanical specimens from Antarctica and subantarctic islands held by the Tasmanian Herbarium. The exhibition was officially opened by Dr Tony Press, Director of the Australian Antarctic Division from 1998 to 2008. Rod's first voyage to Antarctica was on board the *Nella Dan* in 1971; the objective of his first voyage to identify the lichens and mosses and to record detailed information on their substrates. We are fortunate that the high school student who was not particularly interested in plants eventually, as a botanist and illustrator, made them his life's work.

Web ref. www.anbg.gov.au/abrs/Mosses_online/

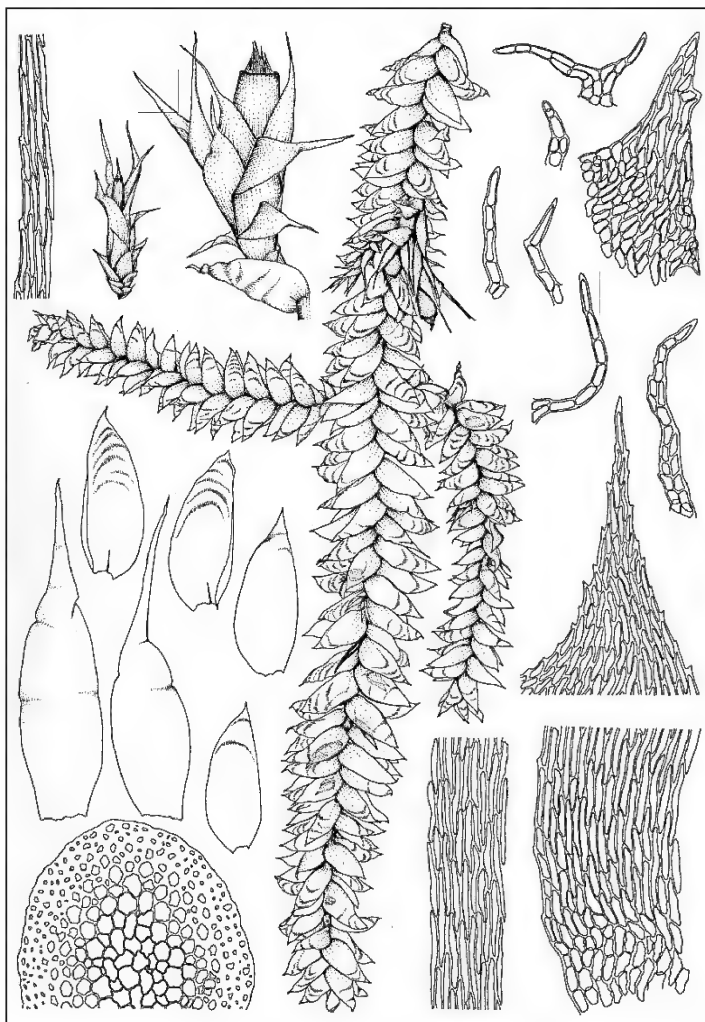


Fig. 3. *Alleniella hymenodonta* collected from the Gordon Road, Tasmania (J. Jarman s.n. 8 Feb 2014, HO 572027).
Artist: Rod Seppelt, with permission.

Australasian Systematic Botany Society Inc.

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Please direct enquiries to Treasurer John Clarkson.

Obituaries

Frank Badman, outback scientist 29 June 1943 – 26 September 2015

W.R. (Bill) Barker^a (compiler), Shane Badman^b, Evan Badman^b, Andrew B. Black^b,
Colin R. Harris^d & John L. Read^e

^aState Herbarium of South Australia; ^bAthelstone, SA; ^cMalvern, SA;

^dRoslyn Park, SA; ^eEcological Horizons, SA

¹Seeking new opportunities, Frank (Francis) Badman's family in 1960 left many years of farming in Dorset, southern England, and joined the the post-war migration into Australia of "ten pound Poms", first residing in Bowral, New South Wales. Like his two brothers, Michael and John (he also had a sister Carol who was a life-long confidante), Frank was soon attracted in early adulthood to the Australian outback, beginning work as a jackeroo in Queensland in 1961 to 1963 on Sutton Downs station, Hughenden and then Galway Downs, Windorah. Until 1971 he worked on several pastoral stations in western Queensland "as a jackeroo, stockman, head-stockman and overseer" (bga-6–11²), before moving permanently to South Australia in 1972, working mainly on station bores and dams operating heavy machinery for a Port Augusta company (bga-1).

These years spent in the bush and working on



Fig. 1. Frank Badman, plant ecologist at Olympic Dam., Roxby Downs, South Australia.

Ph. Western Mining Corporation.

stations left a lifelong impression upon him. He would tell of how he saw the sun rise every day without fail. It is where his love for nature grew and developed. The rains of 1973–77, which caused the "the Great Filling of Lake Eyre"³ of 1974, and the resulting abundance of vegetation and wildlife of the surrounding region influenced his next career change.

On the roads in South Australia's Far North

Frank's purchase of a new truck in 1976 heralded a decade of work as a cartage contractor for the Highways Department building and fixing the notoriously fickle roads ("tracks") of outback South Australia. His life was effectively nomadic, home being close to the roads project of the moment. His calling and backyard remained the bush. His work regime, 15 days on, 9 days off, allowed frequent long camping trips in his Land Rover.

Frank's life at that point saw further changes.

He was introduced to his wife Evan in the Philippines in 1976; they corresponded and eventually married. Evan and young Shane,

¹ A eulogy by Frank's son, Shane, and tributes from his friends in the Far North are accessible on-line (Web ref. 1 and 2).

² Documents 6–11 in Botanic Gardens of SA Library archive of F.J. Badman.

³ Warren Bonython's phrase for this rare event; floods reaching the Lake are more common (Bonython & Fraser 1989).

born in 1980, embraced Frank's bush passions. They spent their first few years in the harsh outback climate of the remote shores of Lake Eyre South (bga-11).

Frank pointedly interpolated in a formal employment record of about 1978 (bga-1):

Married 18 months ago and my wife would like to live in a house rather than in a caravan.

The family finally moved up in the world, building and in 1983 moving to a home in Marree, a tiny outback town of 80 residents. Frank's serious encounters with natural sciences also began with his time on the roads. Being a resident in the outback and keenly interested in the region's natural history, Frank was an attractive recruit for any scientist based far to the south in Adelaide.

Ornithology

In that first year Frank struck up a strong friendship and collaboration with another English-bred Australian attracted by the outback, Shane Parker, who had moved from Alice Springs to become Curator of Birds at the South Australian Museum (Zeidler 1994).

Andrew Black remembers Frank as already a bird watcher when he first went to live in Marree. Within two years he had become an authority on the birds of northern South Australia. His approach was simple. Soon after his arrival he changed from merely keeping records of interesting bird observations and from the beginning of 1977 made careful and accurate notes of every bird that he saw. Since his work took him to many places further north, some beyond Oodnadatta, the result was a comprehensive account of the birds of the region observed during the period January 1977 to July 1978. The paper (Badman 1979) occupied almost two issues of the journal *South Australian Ornithologist* and nothing like it had been published before. It recorded just the kind of information that Shane Parker sought as he was collating reliable information on South Australian ornithology.

Philippa Horton, current Collection Manager of Birds at the SA Museum, writes of his ornithological work:

From what he collected it appears that he was helping Shane to fill in gaps in the collection of common species, to answer ques-

tions of species and subspecies distributions, seasonal occurrence, etc. Clearly he was also invaluable as a field guide, enabling three substantial museum field trips.

For much of two decades Frank recorded and published original information on the birds of the Lake Eyre Basin, which has provided a sound basis for all future ornithological research in the region.

An interesting period followed the record rains of 1973–74. Frank witnessed the immense congregations of birds that remained on Lake Eyre until November 1977, as well as seeing where many dispersed after its salinity reached a critical concentration and food supply failed. He showed the importance of that arid region to waterbirds as well as their extreme fluctuations. He later, in June 1978, followed the flush of bird life associated with a flood of Cooper Creek. His notes included observations of habitat in more detail than provided by many bird writers of the time, including the scientific names of many associated plant species.

Andrew Black collaborated with Frank during the Nature Conservation Society of South Australia's (NCSSA) Great Victoria Desert Survey in August–September 1983 but was able to observe his work more closely during April–May 1985 when Frank invited him to join him, Evan and their small son Shane in a trip that took in the northern rivers Dalhousie, Simpson Desert, Warburton Creek and lower Cooper Creek, all new country to Andrew. They had no GPS, satellite phone or back-up vehicle, only a belief in Frank's total reliability and experience as a bushman. The black notebook and pen were placed above the sun shield close to Frank's forehead and were readily retrieved whenever a bird was seen: the habit of a lifetime.

After 1986 Frank published two monographs for NCSSA, referred to later, and several smaller ornithological papers.

Botany

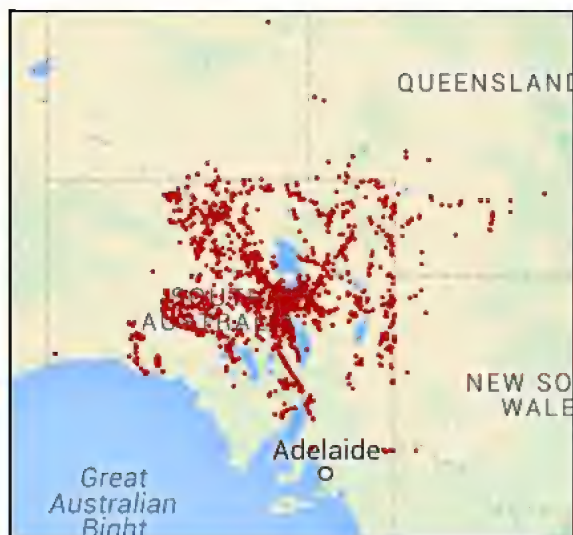
Frank's other major passion was the flora. Contacted by Shane Parker early in Frank's time on the roads, Bill Barker had no need to urge Frank, keen to gain a knowledge of the flora through supporting research in the region, to join the long line of volunteer plant collectors. And there was no need for concern that he met the standards of condition and accompanying detail for good collecting. Over 30 years of

collecting from 1978 to 2007 mainly in South Australia's Far North, on occasions straying across the border into Queensland or on the routes to the south, Frank made over 12,000 plant collections (Fig. 2). Many of these were made in the company of and assisted by Evan on bush trips between work. The high quality of his collections are reflected in several being chosen as types of new species.

Of special note was his rediscovery of *Hemichroa mesembryanthema* at Strangways Springs in 1984 (Chinnock & Badman 1986). The pastoral company S. Kidman & Co. fenced the main stand on the Public Access Route that leads into the Springs to free it of stock.

Frank collected largely on his own or with his family. He only occasionally had the company of State Herbarium botanists, meeting up in Marree. In one instance in February 1984 he guided Laurie Haegi, Joe Weber, Nick Donner and Eric Jackson from the State Herbarium into the Oodnadatta-Mt Barry area to collect the rich flora resulting from extensive summer rains. In another Bill Barker and then Joe Weber joined him for successive weeks in 1986 on his survey of the comparative diversity of birds and plants supported by flowing bores in north-east South Australia. Working their way through Peake Station and further north and west to Mt Barry, it was the only time Bill experienced first-hand Frank's bushmanship (Fig. 3).

Fig. 2. The extent of F.J. Badman herbarium collections.
From Australia's Virtual Herbarium



Gaining employment as a scientist

In 1985 Frank curtailed his contract work with the Highways Department when a change from hourly pay to payment by load made the arrangement inviable (his truck's capacity was too small). After a decade on the roads Frank was determined to gain employment in some aspect of biological science (bga-6–11).

But first Frank devised an immediate project to carry him while seeking a new job, having heard concerns expressed by Kevin Oldfield of Clayton Station on rumoured closure of flowing bores along the Birdsville Track and the effect on the survival of populations of bird species. Of the more than 3000 bores in the Great Artesian Basin still flowing, 170 were in South Australia. With reduced internal water pressure of the underlying Basin some historic mound springs had failed. When it became clear that bores were already being shut down, he sought money to complete a survey before the best of the streaming bores were shut off. Frank acted immediately. Between May and July 1986 he wrote of his proposal and its urgency to the South Australian Ornithological Association, the State Heritage Branch and the Nature Conservation Society (bga-2–5). He was successful in gaining funds and with singular efficiency had surveyed all the bores and written the comprehensive and detailed report by January 1987 (Badman 1987b). He concluded that:

Many people expect that the flow from these springs will increase if the flow from the bores is reduced [by capping many of the bores]. However, this would be of little benefit to birds even if it did happen, as the mound springs are of limited value to birds at present, and indeed may never have been able to support large bird populations. At present the best of the mound springs, with the possible exception of the Dalhousie complex, are equal to the worst of the flowing bores as far as the value to birds is concerned.

This was the first of two major reviews of arid zone birds published as monographs by the Nature Conservation Society, each more comprehensive than his first. The other documented the middle and lower sections of Cooper Creek in South Australia, whose birds he knew better than any other (Badman 1989).



Fig. 3. On the bores survey, in Aug 1986 on Peake Station. Clockwise from top left: a, A flowing bore with grazed surrounds, but, in the background, mallee woodland habitat for birds; b, A proof of bushmanship: Frank lighting a fire in strong winds; recollection of whether he succeeded with the predicted use of just one match has faded with time; c, Lunch break: Frank and his perennial Land Rover, and our collections to press. Ph. Bill Barker

Frank's work was not without incident, one recounted in a letter to Shane Parker dated 3rd Oct 1978:

I did not manage to collect any more specimens after you left. In fact I had some bad luck. I rolled my Land Rover over and ended up in the Lees Hill Dam, south of Stuart Creek H.S. It took me about four hours to winch it out again. It still goes, but is a bit battered on top.

Frank was skirting the rim of the dam in thick plant growth and missed seeing a deep drain. He failed to report on his own well-being.

Despite a history of productive field work, publications under his belt, and support from collaborative scientists, Frank was unsuccessful in applying for positions as technical assistant in the SA Museum and State Herbarium of South Australia, and clerical officer with Far Northern District of the National Parks & Wildlife Service (bga-6-11).¹ Upon leaving Marree in 1985, Frank and the family moved

¹ He also applied in 1986 for the position of contract scientist to study the Coongie Lakes flora and fauna and a wildlife grant to undertake a project on the decline of the Australian Bustard.

to Port Augusta for a brief time before buying a house nearby in Stirling North. During this time Frank secured a position as acting Ranger at Mount Remarkable National Park.

In March 1988 Frank succeeded in his application for the position of botanist at Western Mining Corporation's (WMC) Olympic Dam Project at Roxby Downs, joining the environmental team there, a job suited to his experience of the Far North. Frank was heavily involved in monitoring, survey work and rehabilitation. Frank's encyclopaedic knowledge of the avifauna and plants of northern SA, along with his familiarity with regional locations and personalities was of tremendous benefit to both WMC and the local and visiting scientists who consulted him. John Read, who worked alongside Frank for many years, recalls that, no matter how hard he tried, he could never trump an observation

or record that Frank had made in his decades of travelling, observing and recording birds and plants in the district. Frank's indisputable status as the Far North's premier field botanist of his time saw him lead the comprehensive vegetation surveys. He also coauthored the ornithological monograph, for the *Lake Eyre South Monograph* series conducted by the Royal Geographical Society of SA.

It is understandable, given his unusual route into the scientific world, that Frank sought formal scientific qualifications, initially encouraged by limnologist Professor W.D. (Bill) Williams. George White of Western Mining encouraged him to gain his qualifications and he was mentored early on by ecologist Tim Fatchen followed by John Read, both formerly of the company and then private consultants. Because he lacked an Honours Degree Frank enrolled for a Masters Qualifying as a path to his Ph.D. Frank researched the occurrence and rate of spread of alien vascular plants in northern South Australia to rapidly complete the first degree (Badman 1995) and progressed to tackle his Ph.D. project comparing the effects of grazing and mining on vegetation in the region (Badman 2002). Both degrees were supervised by José Facelli, with co-supervision for his Ph.D. by John Conran. To his encyclopaedic knowledge of the flora Frank added a solid understanding of ecological theory and advanced numerical techniques. He enlisted help from his family, friends and colleagues: many of his pastoralist friends constructed enclosures on their properties, while some also helped with monitoring.

The move to WMC gave further opportunities to extend his environmental conservation work.

Participation with Government and non-Government organisations

Frank's propensity for keen observation and broad knowledge of plants and animals and also of the general vegetation and landscape facilitated his role in the region upon various boards and participation in environmental surveys. Colin Harris remembers, first encountering Frank through their participation in the October 1978 Nature Conservation Society survey of the mound springs. It was quite a big survey – over forty people, a dozen

vehicles and two light aircraft – based on the Margaret River in what is now Wabma Kadarbu Mound Springs Conservation Park. Frank certainly knew his way around that country. He wrote the chapter on birds for the NCSSA survey report (Badman 1985). Frank, a member of the NPWS Northern Consultative Committee from its foundation 1982 and later Deputy Chair, and Colin, working for the associated Environment Department, often crossed paths. With Colin's involvement in the environmental impact study of the Olympic Dam Mine, they shared a particular interest in the follow-up environmental monitoring. Frank always had a well-informed perspective on current issues concerning the region's environment, and the Departmental people working in the region tapped into his knowledge on many occasions.

Frank was active with the local station managers and owners he knew. In 1997 and 2002 he contributed to the District Plans in three regional Soil Boards encompassing the arid lands of South Australia, compiling one (Badman 2002a) and supplying detailed plant lists and vegetation information in others. While the plant lists acknowledged the State Herbarium's resources as a baseline they were further informed by Frank's own knowledge and collection.

Pastoral station reference herbaria and an associated Florula

Frank and Doug Lillecrapp of Todmorden Station:

initiated the development of a herbarium for every pastoral property in the region as well as for the Soil Conservation Boards. (D. Lillecrapp tribute in Web ref. 1, 2).

This was a Marla-Oodnadatta Soil Conservation District (MOSCB) project and Frank undertook it largely in his spare time (Badman 1995a).

As part of the Decade of Landcare, the [MOSCB] secured funding to allow the compilation of a reference collection of plants occurring within the soil conservation district. This project was completed in 1992, together with 30 smaller collections of 85–90 species, one for each of the stations and schools within the district. (Badman 1995a).

Evan recounts that Frank collected the majority of plants from each property in the District,

with contributions from local pastoralists. While in Roxby Downs she was employed between 1992 and 1997 mounting up to 80 specimens a day and 27,000 specimens in total¹. Each reference herbarium was formed of folders of mounted identified specimens. The comprehensive herbarium that Frank and Evan compiled for Olympic Dam has just been transferred from new mine owners BHP to Arid Recovery, a joint conservation venture by the company, the University of Adelaide, Department for Environment, Water and Natural Resources and the community (Web ref. 3), and respectfully named the Frank Badman Memorial Herbarium. It continues to inform new generations of outback ecologists and naturalists.

As an adjunct to this project Frank wrote a Florula of the District (Badman 1995a), which roughly covers the arid region bounded by the Northern Territory border, Lake Eyre South west to the Stuart Highway. Sadly (and inexplicably) the work was never publicised in taxonomic circles and therefore is not consulted by present-day taxonomists. With reference to the State Herbarium's collections and database, as well as broad data covered in its South Australian Census, it contains very short descriptions, and lists stations on which there are specimen-vouchered occurrences. But particularly informative are the notes under each species, covering taxonomy, distribution, biology, and palatability sourced from cited literature or communications from botanists, and his own observations and those of the many pastoralists in the Far North.

An Adelaide-based consultancy

As a result of continued changes at Western Mining, which involved him in various expansion projects, Frank was seconded to the Adelaide office. This reunited the family: Shane had gone away to boarding school at Pembroke some years earlier and was due to finish in 1997. With Adelaide University at hand, it also facilitated completion of his Ph.D.

Following redundancy from Western Mining in 1999, Frank established his own consultancy, Badman Environmental. Business blossomed. Word of mouth and the bush telegraph helped

him develop a meaningful client base and work that often saw him returning to the state's Far North to conduct field research (with reports written back in Adelaide). As in the past, Evan often accompanied Frank on these trips, sharing their mutual love of the outback.

Conclusion

Tributes came readily from the region with news of his passing, all acknowledging the unique and trusted scientific service that he gave to the scattered community of South Australia's Far North which had long embraced him and his family (Web ref. 1, 2).

Despite limited opportunities, Frank had become a productive publishing scientist from an outback base, developed from a relationship of mutual benefit with scientists based in Adelaide and in local pastoral, environmental and mining enterprises. Much of this relationship was developed through his own insightful initiative, but it was also born from the respect that he engendered from those who experienced and valued the depth and breadth of his knowledge.

Acknowledgments

José Facelli, Philippa Horton, Helen Owens and Robyn and Jenny Barker are thanked for providing comment on the manuscript and/or detail.

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3. www.aridrecovery.org.au/history
4. www.friendsofparakssa.org.au/members-directory/friends-of-mound-springs

Archival material

- Botanic Gardens of South Australia Library. Archive of copies of Frank J. Badman's letters and other papers (14 documents - referred to as *bga-x* in text).
- SA Museum Bird Section. Archived copies of correspondence between F.J. Badman and S.A. Parker.
- State Herbarium of South Australia archive. Field books and data sheets documenting his botanical collections (F.J. Badman nos. 142–10924, in collection number order).
- BDBSA BiodataStore Repository (housed in State Herbarium) (F.J. Badman nos. 10937–12576; completeness unchecked: filed by permit/survey numbers).

Ornithological collections

- First records*: 18 Dec 1977. 2 skins of *Vanellus miles* from Nilpinna Station.
- Last record*: 15 Apr 1988, with B. St John. 13 skins and skeletons of *Cacatua sanguinea* from Melrose. 251 specimens in the SA Museum collected by him or assisting others.

Botanical collections

- First record*: F.J. Badman 1, 3 Jun 1978 Stuarts Creek and Margaret Creek near junction with Lake Eyre South
- Last record*: F.J. Badman 12576, 26 Oct 2007, 4 km W of Lake Constance Hut, Kalabity Stn.
- 11,548 collections are recorded to date from the State Herbarium of South Australia ADHERB collection database (his own and with others).

Type specimens of plant species

- Wurmbea dioica* subsp. *citrina* R.J.Bates (Colchicaceae). Type: Common at Lake Eyre South in low sandhills, 9.vi.1978, F.J. Badman 61 (holo: AD, specimen A; iso: AD).

- Senecio cunninghamii* var. *serratus* M.E.Lawr. (Asteraceae). Type: S. Aust. Chintapanna Dam, Witchelina Station, 13.iii.1979, F. Badman 182 (holo: AD 97927194, iso: COLO, G, HO).
- Bergia perennis* subsp. *exigua* G.J. Leach (Elatinaceae). Type: F.J. Badman 1070, 30 km S of Willoughby Homestead and 1 km W of Stuart Highway, South Australia, 1984 (holo.: AD, iso.: NT).
- Spergularia diandroides* L.G. Adams (Caryophyllaceae). Type: Lake Eyre Basin, 30 km W of William Creek on Coober Pedy road, SA, F.J. Badman 1323, 7 Jul. 1984 (holo: CANB; iso: AD, BRI, CBG (at CANB), NSW).
- Sclerolaena fontinalis* Paul G. Wilson (Chenopodiaceae). Type: Purni Bore, Simpson Desert, South Australia, 26°16'S, 136°05'E, 15 July 1984, F.J. Badman 1354 (holo: AD; iso: PERTH).
- Senecio depressicola* I. Thomps. (Asteraceae). Type: South Australia, Goyder Lagoon, 25 km NNE of Clifton Hills Homestead, F.J. Badman 1362, 18 July 1984 (holo: CANB; iso: AD, MEL).
- Swainsona eremaea* Joy Thomps. (Fabaceae). Type: South Australia: 10 km SE of William Creek, F.J. Badman 1375, 27 July 1984 (holo: NSW; iso: AD, CANB).
- Wurmbea nilpinna* R.J. Bates (Colchicaceae). Type: South Australia, Lake Eyre region, Davenport Range, Nilpinna Station, 15.viii.1993, F.J. Badman 7107 (holo: AD; iso: AD).
- Templetonia incrassata* I. Thomps. (Fabaceae). Type: South Australia. 22 km south of Mount Christie Corner, Mobella Station, 30 31'11"S, 133 30'30"E, F.J. Badman 8257, 3.ix.1995 (holo: AD 99647245; iso: AD 99644643).

Vouchers for informally published plant phrase -names

- Acacia* sp. *Pungent* (F.J. Badman 3986)
- Chamaesyce* sp. *Marree* (F.J. Badman 776)
- W.R. Barker = *Euphorbia inappendiculata* var. *queenslandica* Domin
- Eremophila paisleyi* subsp. *Glandular* (F.J. Badman 6011) Chinnock = *Eremophila paisleyi* subsp. *glandulosa* Chinnock
- Halgania cyanea* var. *Bloodwood Bore* (F.J. Badman 4926) Qld Herbarium

Eponymy

The only species bearing Frank's name is as yet unpublished, a species of *Calocephalus* about to be published by Philip Short.

Library

Frank's library of environmental works has been donated by the family to the Botanic Gardens and State Herbarium (some botanical works) and, for the establishment of a library, to the Friends of the Mound Springs (Parks South Australia: Web ref. 4).

Death notices

Harry Butler

Alex George

'Four Gables', 18 Barclay Road, Kardinya, W.A. 6163

Naturalist Harry Butler (christened William Henry), well known in the 1970s for his pioneering television series 'In the Wild', passed away just before Christmas 2015 aged 85. Before coming to national prominence, Harry was almost a household name in Western Australia. He trained as a teacher and in the 1950s teamed with Vincent (Vin) Serventy to travel the State visiting schools to give classes on nature study and recruit student members for the WA Gould League (established in 1939 as an adjunct of the Education Department). Both became well known through participation in the Wild Life Shows, held annually in the Perth Town Hall. Harry's particular interest was reptiles while Vin's was birds, but both had a broad knowledge of local natural history. I got to know them well through the Western Australian Naturalists' Club, where not a meeting passed without one or both having fascinating experiences and specimens to describe. Vin's brother, ornithologist Dominic (Dom) Serventy, was also very active in the club, probably the most active member, since he had been the inspiration behind its founding in 1924 and was editor of the club's journal.

Although I was just beginning my career with Western Australia's then State Herbarium, I was invited to join an expedition with all three, as well as herpetologist/ornithologist Glen Storr, to the Warburton Range, in August 1961 (Fig. 1). Apart from a couple of sorties at the margins (to Queen Victoria Spring and the Jigalong area), this was the first expedition by natural scientists into the Western Australian desert, so there was a real sense of discovery every day. I learnt much from them all about their special interests, field work and camping out.

In the following year Harry organised his own trip, partly to further arouse general interest in natural history and the desert by including Hugh Edwards, then a reporter with the *Daily News*¹, and Maurie Hammond, a photographer with the *Daily News* and *West Australian*, who were sending back stories about the trip². Harry asked me to join them, and so I had another great learning experience (Fig. 2). On this trip we drove cross-country from Winduldarra on the Warburton road to Miss Gibson Hill, although, with the rudimentary maps of the time we were not quite sure where we really

were until afterwards!

Harry sometimes collected plants for the Herbarium. He was not a prolific collector (given his other interests he would have had little time for it), but he had a good memory for what he had seen and

Fig. 1. Harry Butler inspecting Aboriginal shelter, near Mt Eveline, east of Warburton Mission, W.A., August 1961.
Ph. Alex George



¹ Hugh Edwards has been much involved since with maritime archaeology along the WA coast.

² I got into a little strife when I returned to work as one had featured a photo of me with a *Xanthorrhoea thornstonii*. At the time civil servants were supposed to be anonymous!

Fig. 2. Gibson Desert, W.A., August 1962. Top, Harry Butler burning spinifex to flush out fauna, rifle at the ready. Bottom, On dune south of Winduldarra, with Harry Butler on the Landrover's bonnet and reporter Hugh Edwards on roof – no OH & S in those days.

Ph. Alex George

tended to collect plants that he had not seen before. Nonetheless, the Herbarium has about 750 specimens attributed to him, most collected between the late 1950s and the early 1970s. One became the type of *Verticordia staminosa*, which I published jointly with Charles Gardner. He also collected many specimens of a wide range of fauna, now lodged in the Western Australian Museum.

In 1970 Harry received an OBE, upgraded to CBE in 1980. In 1979 he was named, jointly with Neville Bonner, Australian of the Year. He received an Honorary Doctorate from Edith Cowan University in 2003. He was named a National Living Treasure by the National Trust in 2012 and later that year was appointed an Officer in the Order of Australia (AO).



Tom Hartley (1931–2016)

Sadly we have recently received news of the death of Tom Hartley, a long-term staff member of the Australian National Herbarium (CANB) and a valued colleague to those who worked there.

Born in Beaumont, Texas on 9th Jan 1931, Tom was educated in the USA. He worked for CSIRO from 1961 to 1965 (as botanist for the Phytochemical Survey of New Guinea) and again from 1971 until his retirement. In the intervening period he was a curator at the Herbarium of the Arnold Arboretum (A) at Harvard University.

Post-retirement Tom continued to work at CANB, writing treatments for works including

the *Flora of New Caledonia* and the *Flora of Australia*, until just a few years ago when forced to stop due to ill health.

Tom's lifetime of research focused on studies of the family Rutaceae and he collected extensively in New Guinea, Australia and the Pacific. The specimens held at CANB continue to be a valuable resource for research by staff and visiting scientists.

Web reference

<https://www.anbg.gov.au/biography/hartley-thomas-gordon.html>

Anna Monro
Australian National Botanic Gardens

Ray Alcock (1921-2015)

Charles Raymond Alcock followed his father's footsteps into the field of agriculture. E.S. Alcock was an early (1904) graduate of Roseworthy College, where his son was later to study as a scholarship student from 1939 to 1942. Ray's childhood was spent on the Kybybolite Experimental Farm in the south-east of SA, where his father was employed as a supervisor. From Roseworthy, Ray left to serve in World War II, later with the RAF in Britain, gaining a DFC for his efforts. There is a wonderful photograph of him in uniform at Web ref. 1.

Although Ray also gained a diploma in dairy studies from Hawkesbury College and spent his early working life in the dairy industry, he turned his attention to plants (and specifically weeds) in the 1950s. Plants and nature conservation became his passion from then until his death. He joined the Nature Conservation Society of SA in 1964, only two years after its formation. He was nominated for membership by then head of the State Herbarium, Hansjörg Eichler.

Ray became a prolific collector for the State Herbarium of South Australia, which holds around 12,000 specimens collected by him. There is an early collection dated 1933 under

his name from the South-East, but otherwise his earliest collections are from 1963–4 from Eyre Peninsula, where he was employed by Local and State Government as a Weeds Officer for the Eastern Eyre Peninsula Weeds Board, Lincoln Council and the Department of Agriculture. His collections were certainly not restricted to weeds, and early correspondence with the Herbarium indicates that he found a number of plants not previously recorded for the Eyre Peninsula region. In 1971 he was transferred to the head office of the Agriculture Department in Adelaide, where he was employed as an agronomist with the Weeds Section. He was the department's Local Government Liaison Officer for some time and latterly specialised in weeds identification and advice with the Pest Plants Commission, building up an extensive herbarium of weed specimens, which has since been transferred to the State Herbarium.

In his retirement he worked with the State Herbarium as a volunteer and collected widely around Australia during his holiday trips. Plants even extended to his hobbies, as he was an avid and talented wood carver.

Web ref.: <http://collections.slsa.sa.gov.au/resource/BRG+347/769>

Graham Bell
State Herbarium of South Australia

R.F.G. Swinbourne (1936–2015)

Robert Frederick George Swinbourne, usually referred to as Rob, was born 31st July 1936 at Hurstville, New South Wales. While his childhood was spent in Central Australia his schooling was firstly at Mittagong Primary School and then the Hurlstone Agricultural College in Glenfield in New South Wales. Having originally intended being a vet he found that it was plants that were his passion and on his return to Alice Springs his first jobs were in gardening and propagating before he opened The Centre Nursery in the 1950s.

A herbarium had been established in Alice Springs by George Chippendale in 1954 (Chippendale 2002) and Rob joined the staff around 1960. The NT Herbarium has 469 records of his collections, predominantly from 1961 to 1964, some of them collected with Des Nelson. There is one earlier record

of an *Erodium* (Geraniaceae) collected from Ooraminna rockhole in 1957. Rob had a keen interest in the Geraniaceae family and was an early member of the South Australian Geranium & Pelargonium Society, but his interests clearly predated this membership. He described and registered many *Pelargonium* hybrids, particularly those developed by Ted Both and commonly known as "Both's Staphs" (Nottle 2002; Kernick 2016).

Rob was appointed to a new position as Technical Assistant at the Adelaide Botanic Gardens in early 1966. In this position he collected a large number of specimens for the newly established herbarium of cultivated plants, now incorporated in the general herbarium collection. While his cultivated collections are not databased, there are c. 400 of his wild collections resulting from Botanic

Gardens field trips, the major one being to the Lake Torrens area in 1968. He also further extended his interest in growing plants and became very actively involved in a number of specialist societies, for several of which he was the Foundation President, e.g. Australian Begonia Society, Australian Carnivorous Plant Society and the Fern Society of South Australia. His involvement with the South Australian Geranium and Pelargonium Society was such that he was made a Life Member and he also served as President of the Australian Geranium Council. From 1969 to 1987, under the pseudonym 'Ptilotus', he contributed the South Australian notes for the monthly magazine *Your Garden*.

He left his position in the Botanic Gardens in the mid 1980s because of poor health but continued involvement in horticultural pursuits. One of his enduring interests was in early plant and seed catalogues for South Australia and the history of the associated nurseries. This interest had eventually led to the publication of *Years of Endeavour* (Swinbourne 1982) and from the notes gathered in this project, to *Gardens Lost* (Swinbourne 2006), a history of some early South Australian gardens; this latter project was completed by Marilyn Kuchel and the South Australian branch of the Australian Garden History Society after Rob donated his manuscript to them in 1987 due to declining health. In his role of honorary historian of the Nursery and Garden Industry of South Australia he was investigating *Oxalis* species and cultivars with a view to photographing and describing them (Swinbourne 2006), but this appears not to have been published.

In 1962 he was elected as a member of the Royal Society of South Australia and the Linnean Society of New South Wales and on 28th May 1970 he became a fellow of the Linnean Society of London. Morris (1986) listed him as a Life member of the Central Australian Show Society but I have been unable to confirm this, as also the comment that he "received a Mueller Medal for contributions to Australian Horticulture" in 1973. He was clearly a member of the Australian Institute of Horticulture (M.A.I.H.) but the Mueller Medal seems uniquely associated with a different society (ANZAAS) and their medal was awarded to someone else in that year. One of

our readers may be able to throw further light on this.

A photo by Murray Fagg is available on-line (Web ref.)

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Handbook 2)

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Robyn Barker

Moves and retirements

Peter Heenan of the Allan Herbarium, Lincoln

Peter Heenan will leave the Allan Herbarium on April 30th. After 26 years of service he decided it is time for change. He will continue contributing to New Zealand botany, but will be based at Wildlands as a senior ecologist. He will be a great loss to the Allan Herbarium.

Fig. Peter Heenan in the Tasman Valley on Mt Hodgkinson, with Mt Cook/Aoraki in the left background, the Burnett Mountains in the right on the other side of the Tasman River. Taken on 15th April 2016 during a search for *Pachycladon enysii*.

Ph. Kerry Ford

Peter started at Landcare Research's predecessor organisation (DSIR Botany Division) in 1989 as a technical officer. There he added to his parks and recreation management and horticultural expertise an MBIol in Botany from University of Missouri (1993) and a PhD in Botany (2000) from University of Canterbury. More recently he held the position of Research Leader of plant systematics at the Allan Herbarium.

During his time at Landcare Research Peter developed into one of New Zealand's foremost botanists. He published 155 journal articles and four book chapters on taxonomy, nomenclature,



biogeography and phylogeny of New Zealand plant species. Peter discovered and described 80 new plant species. His research programme on *Pachycladon*, a leading model plant for understanding the origin of the New Zealand alpine flora deserves particularly to be mentioned.

We wish him well in his new position.

Landcare Research will advertise for a new plant systematics research leader in early April.

Ilse Breitwieser and Rob Smitsen
Allan Herbarium, Lincoln

Recent retirements

In the last six months news will have reached most members of the retirement of some key contributors to Australian plant systematics over many years. We note, for example, Jim Croft of the Australian National Botanic Gardens, and Barry Conn and Bob Makinson of the National Herbarium of New South Wales. We would be happy to receive contributions to these pages from any members wishing to mark these and other retirements or moves by our fellow systematists.

The Editors

Book reviews

Saint Jean

Review by: Tim Entwisle
Royal Botanic Gardens Victoria, Melbourne

Jean Galbraith: writer in a valley
By Meredith Fletcher
Monash University Publishing, Clayton, 2015
292 pp. ISBN: 978-1-922235-39-8.
AU\$39.95 (paperback)
<http://www.publishing.monash.edu.au/books/jg-9781922235398.html>
Also available as an e-book ISBN: 978-1-922235-40-4

Jean Galbraith had no car, no television and, until her final years, no telephone. These conveniences became pervasive elsewhere during Galbraith's lifetime (1906-1999) but their absence in her home shaped the literary legacy of this much loved botanist from Victoria. Galbraith was first and foremost – in her mind and that of her biographer Meredith Fletcher – a writer, and she wrote almost always from her family home near Tyers, in the Latrobe Valley 158 km west of Melbourne. As we learn, she was also a gardener, conservationist, botanist, farmer, family carer and Christadelphian.

It is this last attribute (you can look it up) that gives me the courage to call this book a hagiography. This is not meant as a criticism or with any cynicism. Jean Galbraith was saint-like (in a good way) in her frugal existence, her caring for others and her desire to preserve and celebrate what she viewed as God's creation. Like Galbraith, the author Meredith Fletcher writes without sentimentality but with sincere love and affection for her subject. And, unlike

the authors of a few biographies I've read recently, Fletcher is a good writer.

Writing began for Jean Galbraith as something to do when her eczema stopped her walking in the bush. Soon though, Galbraith lived to write and wrote to live. Her first nature essay was published when she was 11. At 13 she wrote her first flora, inventing names for the plants she didn't know (an approach I rather like). Despite a clear talent for writing, and a growing interest in reading, Galbraith left school after Grade 8, not wanting to leave Tyers nor incur the expense of further study (both strong themes in the book).

Then the 'miracle'. At age 16 she did get out of Tyers, to attend a Field Naturalist Club of Victoria flower show at Melbourne Town Hall. Here she met and was mentored by schoolteacher turned botanist, Herbert ('H.B.') Williamson, chief organiser of the show and himself encouraged by Ferdinand Mueller to botanise. She corresponded with Williamson weekly until he died in 1931, the start of many such relationships: Edith Coleman became her orchid mentor, joined by Charles Barrett, Donald Macdonald and others.

At 19 she returned to the city, attending two vacation schools at The University of Melbourne, in music and philosophy. Classical music remained a passion for life, after writing and plants. The year 1925 was also when she began her professional writing career, being

invited to contribute to the Australian Garden Lover magazine under the botanical botaniconym 'Correa'. She contributed monthly (480 articles in 480 months she said in 1965) until December 1975, 50 years later.

As evidenced by her first stories, Jean was a keen gardener. The cover of her most famous book, *Garden in a Valley*, shows her garden at the Tyers home 'Dunedin', linear and orderly, at least in the early years. She grew local plants but never tried to reconstruct nature in her garden. In her writing, native Australian plants and 'the bush' were never far away and, over time, she progressed from garden notes to nature writing. Her writing style has been described as more like William Wordsworth or John Muir than the 'blokey' writing of her Australian peers and mentors. In particular, according to Fletcher, unlike her (mostly male) contemporaries she didn't nationalise nature. Galbraith observed and recorded, with few embellishments other than what was needed to create a convincing portrait of her subject. She wrote about what she saw around her, right down to the view through a narrow window as she separated milk from cream in the mornings.

To my tastes, Galbraith's writing is a little overworked and without the mischievous glint I enjoy, but as with Dr Samuel Johnson – one of my literary heroes – I can appreciate the writing and intent without liking the style. UK editor Michael Walter once advised Galbraith that at 91 words her dedication for a book was too long and in danger of looking 'typographically inelegant': the first sentence had 19 commas. In response, Jean reduced it to 'For the Latrobe Valley Naturalists and all who helped'. Still, she loves commas, which I do, as well.

Galbraith also wrote for ABC Radio, including

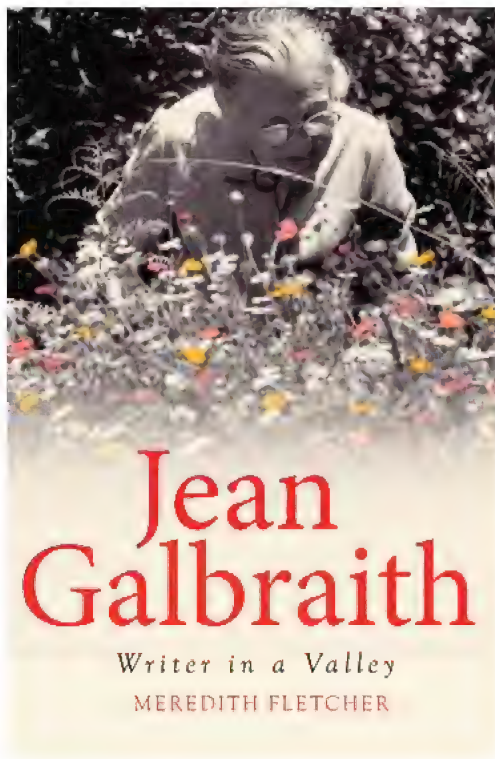
nature study scripts for primary school children. She had no children of her own but 'a natural affinity' with the young; according to Fletcher she showed respect without condescension. She wrote many children's stories, some hitting the mark, some not. Feedback included 'too abstract and scientific for the age range', reminding me of a knockback my father (who died when I was six) got from ABC Radio. His story was called 'The Funny Moo-Cow'. "Dear Miss Entwisle", began the reply, "the

idea of tricks belongs to older children who enjoy these. That kind of fun is a little too subtle for pre-school children. Enclosed are some notes on story writing which you may find helpful. Also your manuscript is enclosed". My father clearly knew when to play the gender card, albeit not successfully on this occasion. Galbraith's use of Correa as a pen name confused readers, some wanting it to be a woman, some a man. However most readers thought the writing was feminine in style, and appreciated it as such.

Galbraith contributed to emerging magazines such as *Australian Plants* when

the Australian Plants Society (aka Society for Growing Australian Plants, aka Australian Growers of Australians) formed. She wrote for British magazines promoting Australian plants and for school magazines. As Galbraith had said in her earlier career, 'you must have a lot of work published to make a living'. Her writing was not only widely valued, but her 'promptness and attention to deadlines were an editor's dream'. She wrote in long hand, which may have been less appreciated by editors. (In her 80s, when she contributed short items to Anne Latreille for inclusion in the gardening page of *The Age*, Anne would type them herself so Jean could get the full payment.)

Her most influential botanical work was



Wildflowers of Victoria, a no-fuss guide to the vascular plants of my home state. In 1949 Winifred Waddell, of Wildflower Diary fame, secured funding for the book, asking Galbraith to be co-author. Jean Galbraith was eventually the only author, although Waddell contributed to the orchid section and Jim Willis was on hand for any technical questions (Waddell was apparently difficult to work with and on occasions Jim also acted as an intermediary between the two women).

Out of this project Jim Willis became yet another active correspondent, admiring Galbraith's expertise as field botanist (that said, you don't hear of many people Jim didn't admire or support – should there be a God, and one with a predilection for saints, he too would be near the top of the queue). The publisher gave Galbraith six months to plan, research and write the flora. Yes, really. It took another year but it's an amazing achievement given the lack of a contemporary flora (Galbraith's book was published in 1950, twelve years before the first volume of Willis' own handbook).

While happy to have the book published, Galbraith was frustrated to discover all her edits added in proof were omitted. So, after the first edition sold out – all 4,000 copies – ,she set to work to make the next edition more accurate. In 1962 she slept in the National Herbarium of Victoria for a fortnight, bunking down in a sleeping bag on Mueller's couch. Jim Willis happened to be acting Director of the Botanic Gardens at the time and was happy to look the other way. It's hard to fathom but the publishers of the second edition again failed to include her edits. Only with the third edition, in 1967 (and the one I have on my shelves), did the text reflect her intent.

Galbraith later wrote A Field Guide to the Wild Flowers of South-east Australia. This volume wasn't as well received as Wildflowers of Victoria but it again featured her trademark pithy descriptions and simple keys. Galbraith was not afraid to simply list the key distinguishing characters when that was more useful than a formal key. Good on her.

In the end Galbraith travelled further afield than Melbourne, to Queensland, Western Australia and eventually to London. In Albany to celebrate 50 years since ANZACs departed

for Gallipoli, she noted that 'there were enough white spider orchids [picked from the wild] to fill a bucket', something she wasn't happy about. I've heard similar stories about bunches of wildflowers collected from East Gippsland back in the day. Galbraith changed her approach and advice to wildflower picking as it became clear it threatened the existence of some species.

As the twentieth century advanced, there was the inevitable loss of bushland around 'Dunedin', mostly due to forest clearing for paper and coal mining. Galbraith became the Gippsland representative for the Native Plants Preservation Society and attended the formation meeting of the Latrobe Valley Field Naturalist Club, both of whom fought, with Galbraith's help, to preserve precious bushland remnants. In her final years she sent submissions to the Land Conservation Council, helping to shape planning decisions in her neighbourhood and beyond. Fletcher adds that her conservation efforts were in part a response to her faith: don't destroy what God created Galbraith wrote. She was not anti-development but an advocate for what she called 'balanced development'.

Jean Galbraith attracted many friends and fans, and in time she became a mentor to others. Leon Costermans said he was inspired by her series on wattles in the *Victorian Naturalist* to write his influential plant guides. Edna Walling became a friend and advocate for her book on Victorian plants and in the 1960s the two of them worked on a book that was unfortunately never published.

I have to confess I knew next to nothing of Jean Galbraith's life before I read this biography. I should have but I didn't. I now feel privileged to have shared her life through Fletcher's writing and to have discovered the remarkable person behind a book on my bookshelf. It got me thinking about how difficult it must have been to be a woman at that time (and still). Not in this case professional recognition or acceptance (that was forthcoming from all) but finding the time and resources to do creative work. To say Jean Galbraith lived a simple life is an understatement. Writing and the family farm were pretty much her only source of income: she notes that when she was finally eligible for the aged pension it gave her a rise in salary.

Galbraith was said to throw nothing out. She recycled all paper and cardboard, and always made her own Christmas cards, embossed with pressed flowers.

For much of her life she cared for other members of her family, and for the frequent visitors to her home. Explaining to a friend why she couldn't enjoy the garden on a 'gloriously sunny day', she said, 'by ten o'clock I had finished my housework and made the butter and set the milk, so I sat down to write'. Only later in the day, while out gathering kindle to

start the fire, was she was able to enjoy a little of that day's sunshine. This delightful book tells of a wonderful woman, and her bread and butter.

Editor's note: Jean Galbraith: *Writer in a Valley* by Meredith Fletcher won the most outstanding book in any category in the 2015 Victorian Community History Awards. The judges said "Fletcher's sensitive and insightful biography of this remarkable woman deserves the highest accolade in this year's VCHA".

A life painting banksias

Review by: Roger Hnatiuk,
Canberra

Banksia lady: Celia Rosser, botanical artist

By Carolyn Landon

Monash University Publishing, Clayton, 2015

214 pp. ISBN: 978-1-922235-80-0. RRP AU\$39.95 (paperback)

<http://www.publishing.monash.edu/books/bl-9781922235800.html>

Also available as an e-book ISBN: 978-1-922235-81-7

There would be no ASBS member who doesn't know the genus *Banksia* and there will be many who will be familiar with the amazing images of *Banksia* painted by Celia Rosser. I wonder, however, if there are young Australian systematists who have come into the profession in the past 15 years who might not have seen Celia's works (Rosser 1981, 1993, 2001)? For both these groups and those who appreciate the finest of botanical art, this new book by Carolyn Landon is a most welcome publication.

The publishers describe Landon as an award winning author of memoirs/biographies, but as a newcomer to writing about botanical art. Her methods are sound and she combines material from extensive interviews as well as much archival research. There may be differences between what people remember, but the story is not only sound but well told about this most unassuming yet brilliant artist. Rosser herself was also not trained in botany, so there is a kind of symmetry here.

Landon tells Rosser's story in 21 chapters plus an epilogue. There is an insert of 32 pages of photos of family, medals and many of the

people responsible for this project that enrich the text. She covers Rosser's childhood with its family trauma and early interest in drawing and painting, her training in design, her early commissioned works for the *Wildflowers of Victoria* and the significant opportunity of the Maud Gibson Trust work that lead to the 'Banksia Project' at Monash University.

Chapter 1 begins with the launch of Volume 1 of *The Book* in London in 1981. Rosser was overwhelmed by all she saw and heard. It was as she said, "too big for her understanding". She met so many of the great names in English speaking botany but she didn't recognise the honour she was accorded. I wonder how many ASBS members remember their youth and whether they too had a time when they met illustrious personages and simply didn't know or understand how significant their fortune was at the time.

Landon then back tracks to pick up Rosser's life in her early days and takes us through the many steps in the journey from a child painter to the fourteen-year-old going to Melbourne Tech and studying art instead of dress-making as her mother had thought. She then discusses a mother painting with friends on outings with children and the first banksia painting *B. serrata* from near Marlo. Landon then takes us to Orbost, where Rosser's friend Brenda Murray formed a Centre for Adult Education (CAE) Art Group. Six women joined and painted together, holding an exhibition at the end of the year. Brenda got the sculptor Clifford Last to open it. It was he who introduced Rosser

to the Leveson Street Gallery and it was really from here that Celia's journey to the Banksia Book really got under way.

It was not all easy though. The Victorian notable, Norman Wakefield, author of *Ferns of Victoria* and editor of the *Victorian Naturalist*, amongst other accolades, was invited to see the paintings Rosser was doing for the Leveson Street Gallery exhibition. He dismissed her as 'only a decorative artist'. There was a degree of contemptuousness, perhaps characteristic of the view of women still current in the mid twentieth century. Others saw the exhibition and recognised Rosser's talents. Bernard Smith, art critic of *The Age*, likened the best of her work to 'the great 18th century tradition of the Bauer Brothers and Redouté'. Jacaranda Press asked her to illustrate a booklet on the wildflowers of Victoria. This introduced her to Jim Willis, who became Government Botanist for Victoria. He greatly encouraged her and she learned much about plant structure and species from him. The Smith review attracted the likes of Carrick Chambers, School of Botany at University of Melbourne, and John Turner, head of Botany and Chairman of the Maud Gibson Trust.

From here Rosser was asked to paint six banksias for the Maud Gibson Trust, thus opening doors to a wider group of influential people. She started to learn the names of a long list of botanic artists like Margaret Stones, Betty Conabere, Margaret Flockton and began to frequent the Library at the Herbarium.

Meanwhile, Rosser took a job with Monash University as a drawer of graphs then

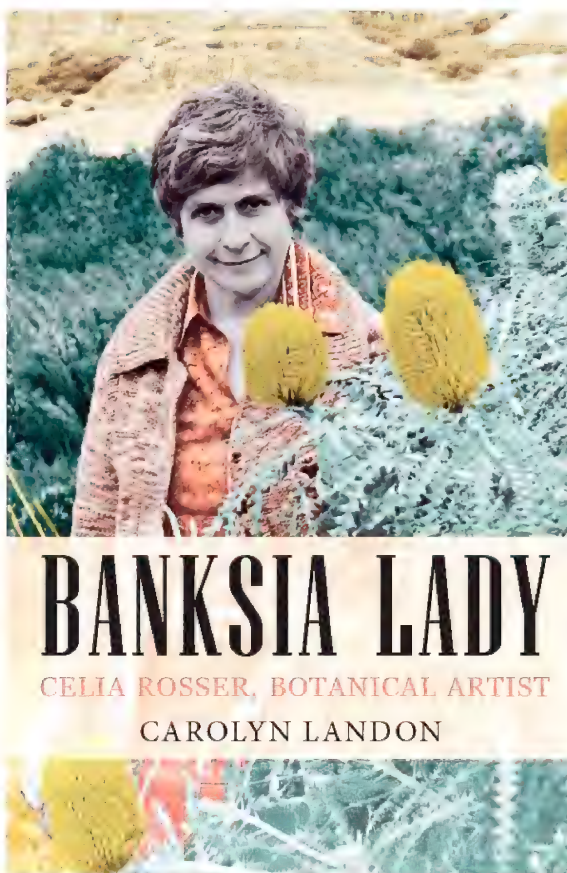
molecules, then salt marsh plants. Finally, she was moved to the Botany Department to do the illustrations for the landmark publication *The Mosses of Southern Australia*. It was then that she met George Scott who would guide and support her until his death near the end of the Banksia project.

Landon then dives into the long and detailed whirlwind of Rosser's engagement in the 'Banksia Book Project'. Chapters follow

chapters on the development of the project, the final selection of Alex George as the botanist to support her, the trials and delights of the essential field work aspect of the project, the development of a 'studio' where she could work, her introduction to the book printers in Britain, the movement of the publishers to Australia and the grand exhibition at Kew Gardens in 1993. The financial disasters of the 1990s had impacts on university funding. Landon does an excellent job of placing the 'Banksia Project' into the context of the times. It is fascinating to see how hard generations of administrators and staff

worked to shield Rosser from the challenges of the times. While others were suffering greatly, losing jobs and functions, Celia was permitted to continue with the monumental project.

With Volume 3, the pressure on Rosser increased. The new economic order had arrived but the creativity of individual, hand painted works of this complexity and quality are not amenable to the spreadsheets of financial departments. Celia was fortunate too to have supporters such as Dame Elizabeth Murdoch, whom she knew from the Maud Gibson Trust work.



I was on the lookout for some information about the printing of the folio editions, but these are only mentioned in passing in a letter between Professors Ray Martin and Mal Logan. The folios appear to have been very successful financially, but they were not part of the original plans for The Book. After Alex George displayed a series of prints he was checking at WA Herbarium, I suggested a folio set would be great. He said the publishers weren't interested but he would raise it. I don't know what happened, but the folios eventuated and sold well.

I had recommended to John Clarkson that Alex should review this book, but he reported

that Alex was already committed. Alex said he spoke to Landon and some errors will be corrected in later printings. I noted a few editorial errors, but except for those afflicted with 'editorialitis', they will not detract from a reader's appreciation of the life and the person behind the exquisite *Banksia* paintings and prints.

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- Rosser, C. (1981, 1993, 2001). The banksias: watercolours. Volumes 1-3. (Monash University: Melbourne)

In the exact footsteps of Allan Cunningham

Review by: Tony Orchard
Canberra

Tracking and Mapping the Explorers Volume 1. The Lachlan River Oxley, Evans & Cunningham 1817. John Whitehead. Sunnyland Press, Mildura (2003). ISBN 0-646-43038-6 / 9 780646 430386. Soft cover, A4, 363 pages, heavily illustrated in black & white & halftones.

Tracking and Mapping the Explorers Volume 2. Oxley and Evans, Macquarie River 1818. John Whitehead (2005). ISBN 978-0-9757163-0-1.

Cunningham's Tracks 1827. His Journey Through the Gwydir & Inverell Shires. Fay Cairns & John Whitehead (2011). Softcover, A4. ISBN 978-0-9757163-7-3

Cunningham's Pandora's Pass. Tracking & Mapping the Explorers 1823 Volume 4. 2nd Amended Edition. John Whitehead. Privately Published (2014). ISBN 978-0-9757163-8-0. Soft cover, spirally bound, A4, 220 pages, heavily illustrated in colour & black & white.

Cost of each: about \$45 plus postage. Order through the Allan Cunningham Project website (http://artuccino.com/Allan_Cunningham_Botanist_1839/).

Allan Cunningham came to Australia as a botanist, and left as a noted explorer. He was sent by Banks to collect propagation material of Australian plants for Kew, but soon developed a taste for geographical exploration in its own

right, seeing his role, at least in part, as being to discover land suitable for pastoral development, and less importantly, for agriculture. He had had a classical education in England, followed by some experience in horticulture and plant taxonomy at Kew, and had a good working knowledge of zoology and geology. On his way to Australia he was sent to Brazil with James Bowie in 1814–1816. Neither of the young men (in their early 20s) had had any experience of field work in primitive conditions, but both were quick learners. By the time he arrived in Sydney in late 1816 Cunningham was already field-hardened. He was immediately assigned by Governor Macquarie to join the expedition led by Oxley to trace the courses of the newly discovered Lachlan and Macquarie Rivers from April to September 1817. Cunningham had had no formal education in navigation or surveying, but he almost certainly learned by observing the officers on board ship from the UK to Brazil and then to Australia. John Oxley, the NSW Surveyor General, came from a naval background, and it is likely that Cunningham watched and learned as Oxley plotted positions and mapped landmarks on the 1817 expedition. Whitehead observes that Cunningham's observations and calculations of latitude and longitude frequently differed from those in Oxley's journal.

On his return to Sydney Cunningham found instructions from Banks to join the surveys of

the north and northwestern coasts of Australia with Phillip Parker King, an activity that fully occupied him from 1817 to 1822. Cunningham and King became close friends, and it is clear from Cunningham's journals and letters that he took a keen interest in the course of the expeditions, and indeed in the whole business of sailing, mapping and exploring. King was a very able surveyor and cartographer, a worthy successor to Flinders, and Cunningham polished his own mapping skills under King's tutelage.

At the conclusion of the King voyages Cunningham settled down to botanical exploration in New South Wales, at first in the country just west of the Dividing Range, north and south from Bathurst, but gradually extending his exploration north until he discovered the Darling Downs in 1827. From 1824 he visited Moreton Bay by sea, and gradually extended his exploration of what is now SE Queensland in a series of land expeditions from 1824 to 1829.

It should be noted that in almost all of his expeditions Cunningham was the first or one of the first Europeans to visit the areas involved, and in most cases he (or his companions Oxley or King) was the first to survey and map them. By necessity these explorers assigned English names to the main features seen, and these were the only landmarks to which they could refer. As a result Cunningham's specimens have sparse information concerning their place of collection. However he kept a detailed journal, wrote extensive lists of his collections, and kept up a copious correspondence. From these sources we know what he collected and roughly where. However it is sometimes

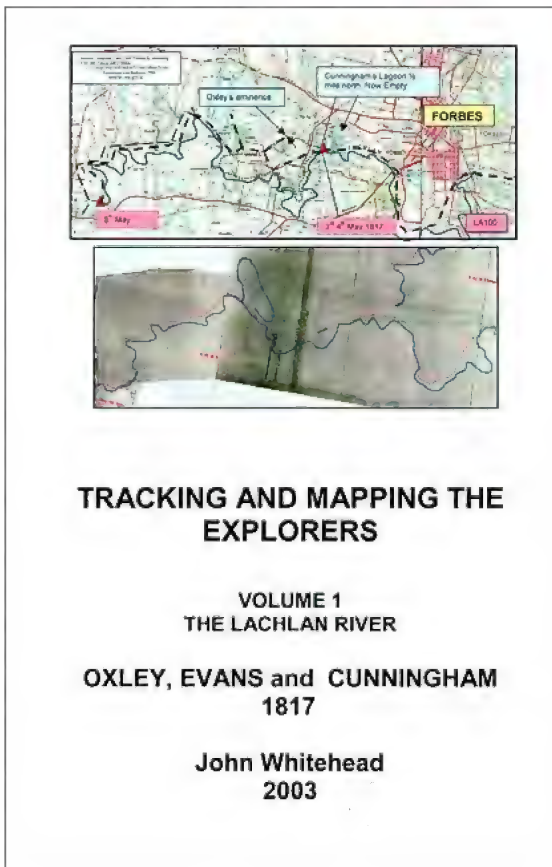
necessary to try to establish exactly where particular specimens were collected. Help is now at hand.

John Whitehead, a retired engineer, has spent nearly 20 years painstakingly reconstructing Cunningham's routes on a number of expeditions from the original working notebooks which are now held by the State Records Office of New South Wales and the Mitchell Library. In these notebooks Cunningham jotted down

cross bearings of major landmarks, lists of sightings for latitude and longitude, and barometrical readings of altitude. From these it has been possible to plot Cunningham's exact route on modern maps, definitively identifying the streams, hills, swamps etc that he crossed, often to accuracies measured in metres.

Whitehead has published three volumes on the Cunningham expeditions and a fourth on the related Oxley expedition of 1818 (in which the botanist was Charles Fraser). These books are packed with information on the routes, supplemented with hundreds of maps, sketches, hi-

storical and recent photographs, extracts from Cunningham's journals, and numerous asides explaining historical incidents and history, people, places and events. As if this was not enough, each book starts with a detailed explanation of 19th century surveying methods, and a discussion of expeditionary techniques, logistics and outcomes, not only of Cunningham but of his contemporaries. There are frequent discussions of previous attempts to map the routes, reproductions of sketch maps from journals, biographies of the main characters and much else.



Why is this important? Cunningham was meticulous in attaching what he called 'tickets' to each of his specimens, and these pointed to the localities where he collected his specimens, either directly, or via the detailed numbered lists that he sent to Banks and Aiton along with each consignment of specimens. However the localities, as already mentioned, were frequently those named during the expeditions. These names required official sanction, and this sanctioning sometimes took a number of years. In the process some names were accepted, others were replaced, and some were even moved from the hill identified by Cunningham to another nearby. The localities on the tickets or in the lists cannot therefore be entirely relied upon, and sometimes cannot be placed at all. For example, on the Oxley Expedition, 'Mt. Cunningham' is now Mt. Mulguthrie, 'Mt. Aiton' is now Mt. Narriah and 'Peel's Range' is now the Cocoparra Range. Later, near Lake Cargelligo, 'Mt. Flinders' is now Mt. Daylight, 'Mt. Porteous' is Mt. Waabalong, 'Mt. Torrens' is Mt. Grace, and 'Goulburn's Range' is now Mt. Bowen in the Ural Ridges. Dozens more examples could be given. Consequently, for those searching for the exact provenance of rare species of Cunningham's collection, it is now possible to cut through the archaic geographical nomenclature. This may not necessarily lead to rediscovery (much of Cunningham's route is now cleared farmland) but it will save much fruitless searching in the wrong places.

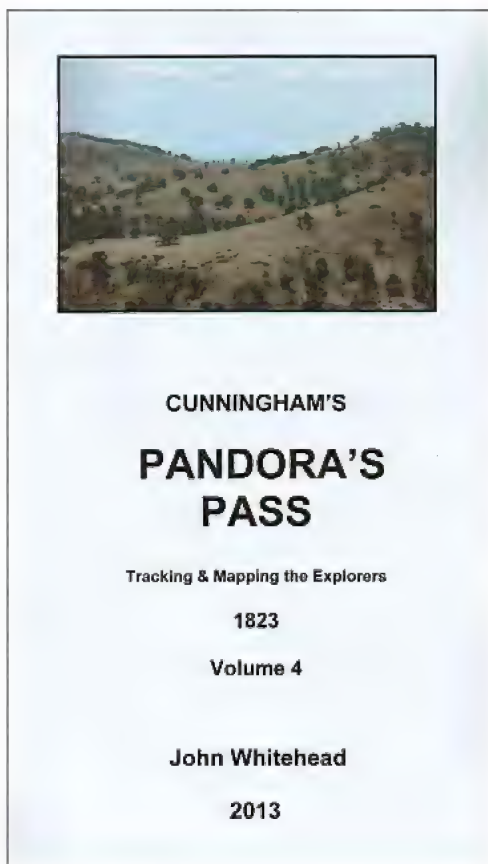
These books should be in the libraries of all herbaria in Australia. They will probably also find a place in the personal libraries of those who have an interest in the early European history of Australia. They are far more

than a dry account of localities, sightings, calculations of latitude, longitude and altitude. The author includes substantial extracts from Cunningham's and Oxley's journals, and brings these to life with an eclectic smorgasbord of asides, explanations, historical tidbits, and reproductions of sketch maps. They are the sort of books that one can dip into at random and become engrossed in. For example, in one place where it is recorded that Oxley had lost his horses (again!) it is pointed out that English explorers, at this early period at least, did not

believe in hobbling them overnight. Later a system of loose hobbles was devised that allowed the horses to search for food overnight without straying too far.

There are three very good reasons why I recommend purchase of these books. First, they are packed full of very detailed information which is unobtainable elsewhere. Good research deserves to be supported, and these books are meticulous in their attention to detail, arguments for the views advanced, and reasons why alternative views should be discounted. They represent a decade or more of intense investigation, and (pardon the pun) no stone has been left unturned. It is difficult to imagine that they will ever be surpassed.

Second, privately published books or those by boutique publishers (as these are), are usually published in very small numbers. This has two consequences. Once they are gone they are gone, and the few copies that were sold will appear a very good investment in years to come. I was reminded of this recently when trying to locate a copy of Ida Lee's 'Early Explorers of Australia' published in 1925 by Methuen & Co. (hardly a boutique publisher). According to my favourite search engine for secondhand books,



there are only five copies available worldwide (from ‘thousands of booksellers selling millions of books’), at prices ranging from US\$40 (surely a bargain) to US\$231. The third reason is also important. Books like these are labours of love. The authors don’t expect to make a profit – they are usually startled if they break even on printing costs. It is very dispiriting to

spend years meticulously researching a subject only to find that just a handful of people are prepared to pay the cost of a takeaway meal to read what you have written. Buying books such as these will surely encourage the author to continue his work, plotting the routes of other explorers and other expeditions. This is an outcome surely to be embraced.

New books

The oldest foods on earth: a history of Australian native foods with recipes

By John Newton

Publishers: NewSouth Books: Sydney, Feb. 2016

Paperback, 288pp, 210x135mm. ISBN: 9781742234373

AUD\$29.99, NZD\$34.99

<https://www.newsouthbooks.com.au/books/oldest-new-ingredients-earth/>

We celebrate cultural and culinary diversity, yet shun foods that grew here before white settlers arrived. We love ‘superfoods’ from exotic locations, yet reject those that grow here. We say we revere sustainable local produce, yet ignore Australian native plants and animals that are better for the land than those European ones.

In this, the most important of his books, John Newton boils down these paradoxes by arguing that if you are what you eat, we need to eat different foods: foods that will help to reconcile us with the land and its first inhabitants. [Publisher’s blurb].

Anchoring biodiversity information – Sherborn

Edited by E. Michel

Pensoft Publishers, January 2016

298 pp.; P-ISBN paperback:

9789546428066

Cost: € 62.00

<http://www.pensoft.net/book/13085/anchoring-biodiversity-information-sherborn>

http://zookeys.pensoft.net/browse_journal_issue_documents.php?issue_id=762 – free access

Released as both a book and also as a special edition of *ZOOKEYS* based on a conference held at the Natural History Museum in London in 2011. It celebrated the 150th year since the birth of Charles Davies Sherborn, author of

Index Animalium, the animal equivalent of our own *Index Kewensis* by Hooker & Jackson. The latter dates from 1885 and is now absorbed into the *International Plant Names Index* (IPNI).

While there is an early concentration on Sherborn in his time, later papers deal with the current and new tools available for accessing taxonomic literature and the future of biological nomenclature in this digital age. In the earlier papers emphasis is understandably on zoological nomenclature, but by the end a number of papers deal with biological nomenclature, particularly those looking to the future. Well worth dipping into for an understanding of the enormous changes that have occurred in more recent years.

The invention of nature. Alexander von Humboldt’s new world

By Andrea Wulf

John Murray Publishers: London, Oct. 2015

Illustrated. 496 pp.

ISBN: 1848548982; 9781848548985

Prices range from \$A40-55; Paperback \$A15 – 22.

The story of the remarkable German scientist, Alexander von Humboldt, who influenced many other well-known scientists, as well as artists, intellectuals and revolutionaries. Had things worked out as planned, he and Bonpland would have been the botanists on Baudin’s voyage to Australia (Helferich 2011). But they went to South America instead, even while still making plans to join Baudin in New Holland, and the rest, as they say, is history. Regarded by many as a polymath (Web ref. 1) who “never mutated into a hide-bound panjandrum” (Web ref. 2), Humboldt’s life is presented to the English speaking world in a book which has already gathered much attention and many awards. A collection of reviews is available through the

author's page (Web ref. 3), as well as the other web references below. Helferich's book is another perspective on Humboldt's life. It was first published in 2004 to mark the bicentenary of the completion of Humboldt's expedition to South America but has since been issued as an eBook (the Kindle edition is \$7.29). Several of the chapters are available in full on the web site below.

References

Helferich, G. (2011). *Humboldt's cosmos: Alexander Von Humboldt and the Latin American journey that changed the way we see the world*. Tantor eBooks. https://books.google.com.au/books?id=xzxkOH5FymAC&dq=Humboldt+Baudin&source=gs_navlinks_s

Web ref. 1: <https://europeancollections.wordpress.com/2016/01/25/an-influential-polymath-alexander-von-humboldt/>

Web ref. 2: www.theguardian.com/books/2015/nov/13/the-invention-of-nature-the-adventures-of-alexander-von-humboldt-andrea-wulf-review

Web ref. 3: www.andreawulf.com/invention-of-nature/

Web ref. 4: www.nytimes.com/2015/09/27/books/review/the-invention-of-nature-by-andrea-wulf.html

The monkey's voyage: how improbable journeys shaped the history of life

By Alan de Queiroz

Basic Books, New York, 2014

Available in both hard copy and digital versions

Mike Crisp's review of *The Monkey's Voyage* can be found in the latest issue of *Banksia* (Web ref.).

Web ref. www.sasb.org.au/banksia/Banksia_12_Mar_2016.pdf

Global cotton

Many plants, such as tobacco, the various spices, tulips and fungi, have had an effect on global history and the economy and have been the subject of books in the past. Now it is the turn of cotton. Here are two books on the subject, both published in recent years and both covering similar ground.

Cotton. The fabric that made the modern world

By Giorgio Riello

Cambridge University Press, April 2015

436 pp, paperback, ISBN:

9780521166706

Price \$A46.95

Today's world textile and garment trade is valued at a staggering \$425 billion. We are told that under the pressure of increasing globalisation, it is India and China that are the new world manufacturing powerhouses. However, this is not a new phenomenon: until the industrial revolution, Asia manufactured great quantities of colourful printed cottons that were sold to places as far afield as Japan, West Africa and Europe. Cotton explores this earlier globalised economy and its transformation after 1750 as cotton led the way in the industrialisation of Europe. By the early nineteenth century, India, China and the Ottoman Empire switched from world producers to buyers of European cotton textiles, a position that they retained for over two hundred years. This is a fascinating and insightful story which ranges from Asian and European technologies and African slavery to cotton plantations in the Americas and consumer desires across the globe. [Publisher's blurb].

Web ref. www.history.ac.uk/reviews/review/1436

Empire of cotton. A global history

By Sven Beckert

Published by Vintage, 10th November 2015

Paperback, 640 pp. ISBN:

9780375713965; ISBN-10:

0375713964. There are earlier editions by Penguin and Knopf which will affect the ISBN number and may affect the price.

Price range: \$A26-36.

In a remarkably brief period, European entrepreneurs and powerful politicians recast the world's most significant manufacturing industry, combining imperial expansion and slave labor with new machines and wage workers to make and remake global capitalism. The result is a book as unsettling as it is enlightening: a book that brilliantly weaves together the story of cotton with how the present global world came to exist. [Publisher's blurb].

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www.nytimes.com/2015/01/04/books/review/empire-of-cotton-by-sven-beckert.html?_r=0

www.historytoday.com/reviews/empire-cotton

www.history.ac.uk/reviews/review/1873

Robyn Barker

Chapter conveners

Adelaide

Robyn Barker
State Herbarium of South Australia
Department for Environment, Water & Natural Resources
PO Box 1047, Adelaide SA 5001
Tel: (+61)/(0)8 8222 9348
Email: robyn.barker@sa.gov.au

Armidale

Jeremy Bruhl
Department of Botany
Univ. of New England, Armidale, NSW 2351
Tel: (+61)/(0)2 6773 2429
Email: jbruhl@une.edu.au

Brisbane

Hernan Retamales
Earth, Environmental and Biological Sciences
Science and Engineering Faculty
Queensland University of Technology
GPO Box 2434, Brisbane Qld 4001
(+61)/(0)452 510 421
Email: hernanalfonso.retamales@student.qut.edu.au

Cairns

Katharina Schulte
Australian Tropical Herbarium (CNS)
James Cook University Cairns Campus
PO Box 6811, Cairns Qld 4870
Tel: (+61)/(0)7 4232 1686
Email: katharina.schulte@jcu.edu.au

Canberra

Alexander Schmidt-Lebuhr
Centre of Australian National Biodiversity Research
CSIRO Plant Industry
Canberra, ACT 2601
Tel: (+61)/(0)2 6246 5498
Email: Alexander.S-L@csiro.au

Christchurch

Ilse Breitwieser
Allan Herbarium, Landcare Research New Zealand Ltd
PO Box 69040, Lincoln 7640, New Zealand
Tel: (+64)/(0)3 321 9621; Fax: (+64)/(0)3 321 9998
Email: breitwieseri@landcareresearch.co.nz

Darwin

Ian Cowie
Northern Territory Herbarium
PO Box 496, Palmerston, NT 0831
Tel.: (+61)/(0) 8999 4511
Email: ian.cowie@nt.gov.au

Hobart

Matt Baker
Tasmanian Herbarium,
Tasmanian Museum and Art Gallery
PO Box 5058, UTAS LPO, Sandy Bay, Tas. 7005
Tel: (+61)/(0)3 6226 1029
Email: matthew.baker@tmag.tas.gov.au

Melbourne

Frank Udovicic
National Herbarium of Victoria
Private Bag 2000, South Yarra, Vic. 3141
Tel: (+61)/(0)3 9252 2313
Email: frank.udovicic@rbg.vic.gov.au

Perth

Juliet Wege
Western Australian Herbarium
Department of Environment & Conservation
Locked Bag 104, Bentley Delivery Centre, WA 6983
Ph: (+61)/(0)8 9219 9145
Email: Juliet.Wege@dpaw.wa.gov.au

Sydney

Peter Weston
National Herbarium of NSW
Mrs Macquaries Road, Sydney, NSW 2000
Tel: (+61)/(0)2 9231 8111
Email: peter.weston@rbgsyd.nsw.gov.au

Contacting major Australasian herbaria and systematics institutions

International calls. Australia +61, New Zealand +64, then drop leading zero from bracketed area code

AD tel: (08) 8222 9307 fax: (08) 8222 9353 www.environment.sa.gov.au/Science/Science_research/State_Herbarium	HO tel: (03) 6226 2635 fax: (03) 6226 7865 www.tmag.tas.gov.au/collections_and_research/tasmanian_herbarium	MEL tel: (03) 9252 2300 fax: (03) 9252 2350 www.rbg.vic.gov.au/science/herbarium-and-resources	NSW tel: (02) 9231 8111 fax: (02) 9251 7231 www.rbg Syd.nsw.gov.au/science/Herbarium_and_resources
CANB tel: (02) 6246 5108 fax: (02) 6246 5249 www.anbg.gov.au/	BRI tel: (07) 3896 9321 fax: (07) 3896 9624 www.qld.gov.au/environment/plants-and-animals/plants/herbarium/	DNA tel: (08) 8999 4516 fax: (08) 8999 4527 http://lrm.nt.gov.au/plants-and-animals/herbarium	PERTH tel: (08) 9219 8000 fax: (08) 9334 0327 http://dpaw.wa.gov.au/plants-and-animals/wa-herbarium
CNS Tel: (07) 4232 1837 www.ath.org.au/	NT tel: (08) 8951 8791 fax: (08) 8951 8790 www.lrm.nt.gov.au/plants-and-animals/herbarium	AK tel: (09) 306 7060 www.aucklandmuseum.com/collections-research/	Australian University Herbaria Contact CHAH representative: Murray Henwood University of Sydney murray@bio.usyd.edu.au
Council of Heads of Australasian Herbaria (CHAH) Chair: Prof. Michelle Waycott (AD). Michelle.Waycott@sa.gov.au www.chah.gov.au	CHR tel: (03) 321 9999 fax: +(03) 321 9997 www.landcareresearch.co.nz	WELT tel: (04) 381 7261 fax: (04) 4 381 7070 http://collections.tepapa.govt.nz/	ABRS tel: (02) 6250 9417 fax: (02) 6250 9555 email: abrs@environment.gov.au www.environment.gov.au/science/abrs

ASBS publications

Australasian Systematic Botany Society Newsletter

Back issues

Back issues of the Newsletter are available from Number 27 (May 1981) onwards, excluding Numbers 29, 31, 60, 84–86, 89–91, 99, 100, 103, 137–139, and 144. Here is the chance to complete your set.

Australian Systematic Botany Society Newsletter No. 53

Systematic Status of Large Flowering Plant Genera

Edited by Helen Hewson, 1987

This Newsletter issue includes the reports from the February 1986 Boden Conference on the “Systematic Status of Large Flowering Plant Genera”. The reports cover: the genus concept; the role of cladistics in generic delimitation; geographic range and the genus concepts; the value of chemical characters, pollination syndromes, and breeding systems as generic determinants; and generic concepts in the Asteraceae, Chenopodiaceae, Epacridaceae, *Cassia*, *Acacia* and *Eucalyptus*.

Cost: Free for all newsletters except Number 53 (postage may be charged)

Cost: Number 53: \$5, plus \$1.75 postage (in Australia)

Cheques payable to “ASBS Inc.” Mastercard & Visa payments accepted.

For back issues of the newsletter **ONLY**, contact:

Anna Monro
ASBS Sales
Australian National Botanic Gardens
GPO Box 1777
Canberra, ACT 2601, Australia

Emailing is preferred means of contact, but alternatively fax credit card details to:

Anna Monro Fax: (+61)/(0) 2 6250 9599

Enquiries: anna.monro@environment.gov.au Tel: (+61)/(0) 2 6250 9530

Evolution of the Flora and Fauna of Arid Australia (book)

Edited by W.R. Barker & P.J.M. Greenslade.

Peacock Publications, ASBS & ANZAAS, 1982

This collection of more than 40 papers will interest all people concerned with Australia's dry inland, or the evolutionary history of its flora and fauna. It is of value to those studying both arid lands and evolution in general. Six sections cover: ecological and historical background; ecological and reproductive adaptations in plants; vertebrate animals; invertebrate animals; individual plant groups; and concluding remarks.

Cost: \$20, plus \$10 postage (in Australia).

This book is almost out of print. There are a few remaining copies.

To order a copy of this book email Bill Barker at: bill.barker@sa.gov.au

History of Systematic Botany in Australasia (book)

Edited by P.S. Short. A4, case bound, 326 pp. ASBS, 1990

For all those people interested in the 1988 ASBS symposium in Melbourne, here are the proceedings. It is a well presented volume, containing 36 papers on: the botanical exploration of our region; the role of horticulturalists, collectors and artists in the early documentation of the flora; the renowned (Mueller, Cunningham), and those whose contribution is sometimes overlooked (Buchanan, Wilhelmi).

No longer available

AUSTRALASIAN SYSTEMATIC BOTANY SOCIETY INCORPORATED

The Society

The Australasian Systematic Botany Society is an incorporated association of over 300 people with professional or amateur interest in botany. The aim of the Society is to promote the study of plant systematics.

Membership

Membership is open to all those interested in plant systematics. Membership entitles the member to attend general meetings and chapter meetings, and to receive the Newsletter. Any person may apply for membership by filling in a "Membership Application" form, available on the Society website, and forwarding it, with the appropriate subscription, to the Treasurer. Subscriptions become due on 1 January each year.

The ASBS annual membership subscription is AU\$45; full-time students \$25. Payment may be by credit card or by cheques made out to Australasian Systematic Botany Society Inc., and remitted to the Assistant Treasurer. All changes of address should be sent directly to the Assistant Treasurer as well.

The Newsletter

The Newsletter is sent quarterly to members and appears simultaneously on the ASBS Website. It keeps members informed of Society events and news, and provides a vehicle for debate and discussion. In addition, original articles, notes and letters (not exceeding ten published pages in length) will be considered. Citation: abbreviate as *Australas. Syst. Bot. Soc. Newslett.*

Contributions

Send copy to the Editor preferably by email attachment submitted as: (1) an MS-DOS file in the form of a text file (.txt extension), (2) an MS-Word.doc file, (3) a Rich-text-format or .rtf file in an email message or attachment or on an MS-DOS disk or CD-ROM. Non-preferred media such as handwritten or typescripts by letter or fax are acceptable, but may cause delay in publication in view of the extra workload involved.

Formatting of submitted copy. Please use Word formatting buttons for paragraph indents, bullets, etc. and for tables. All text must be in upper and lower case; e.g., do not use upper case for titles, headings or authors in reference lists. Do not format primitively with tabs, which change with the Normal style sheet. If embedding tables or references or other Objects from other software (Excel, bibliographic software, etc.) ensure that these are converted to Word tables or paragraphs. Letters in abbreviations of Australian States (SA, WA, etc., but Vic., Qld) and organisations (e.g. ASBS, ABRIS) should not be separated by full-stops, but initials should be (e.g. W.R. Smith, not WR Smith).

Images. Send images individually with captions in accompanying text document or email, not arranged in composite. Do not include them embedded in a text file. If you do, you will be asked for them separately. Inclusion of images supplied may depend on space being available. Resolution needs to suit press as well as web publication. So improve scanned resolution if printing your image is pixellated at a width of at least 7 cm (up to a 15 cm full page). Contact the Editors for further clarification.

The deadline for contributions is the last day of February, May, August and November. All items incorporated in the Newsletter will be duly acknowledged. Authors alone are responsible for the views expressed, and statements made by the authors do not necessarily represent the views of the Australasian Systematic Botany Society Inc.

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Advertising

Advertising space is available for products or services of interest to ASBS members. The current fee is AU\$200 per full page, \$100 per half-page or less.

Flyers may be approved for inclusion in the envelope for products or services of interest to ASBS members. The current fee is \$200 per flyer, plus the cost of inserting them (usually roughly \$50). Flyers are not part of the Newsletter and do not appear with the Newsletter on the ASBS Website.

A 20% discount applies for second and subsequent entries of the same advertisement. Advertisements from ASBS members are usually exempt from fees but not the insertion costs in the case of a flyer. Contact the Newsletter Editors for further information.

Editors

Bill Barker State Herbarium of South Australia PO Box 1047 Adelaide SA 5001 Tel. (+61)/(0) 427 427 538 Email: bill.barker@sa.gov.au	Book Reviews editor: John Clarkson Queensland Parks & Wildlife PO Box 156 Mareeba, Qld 4880 Tel: (+61)/(0) 7 4048 4745 Email: John.Clarkson@qld.gov.au	Robyn Barker State Herbarium of South Australia PO Box 1047 Adelaide SA 5001 Tel. (+61)/(0) 8 8222 9348 Email: robyn.barker@sa.gov.au
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Contents

From the President

National Taxonomy Workshop	1
ASBS 2016 Conference	1
Future ASBS conferences	1
Hansjörg Eichler grants	1
Decadal Plan	1
Newsletter cover art	2
And finally	2

ASBS Inc. business

A request from the Treasurer	2
<i>Notice of 2016 Annual General Meeting.</i>	2

Coming meetings

ASBS conference and field trip 2016	3
13 th Australian Bryophyte Workshop in South Australia Date changed to late August 2016	3
31 st John Child Bryophyte and Lichen Workshop	4
<i>Notice. Nominations for membership of the 2015–16 Council</i>	4
<i>Notice. Australian Conservation Taxonomy Award.</i>	4

Eichler Research Fund reports

Phylogeny of Loganiaceae tribe Loganieae, using chloroplast and nuclear ribosomal sequence data.	5
Phylogeny and biogeography of <i>Zieria</i> (Rutaceae).	7
Investigating the phylogeny, morphology, genetic diversity, phylogeography and ecology of <i>Spyridium parvifolium</i>	9

Articles

Progress towards a complete key to all Australian vascular plants – Step 1: APC harmonisation of existing KeyBase keys.	13
---	----

News

Summer scholarships at the State Herbarium of SA	16
New eNews for Fungimap.	16
Rare fairy circles	16
Seeking international agreement on what is “native”	17
Systematics: the future?	17
Taxonomy Appreciation Day March 19 th 2016	17
Italy celebrates International Women’s Day	17
Can <i>Solanum</i> sp. <i>Bullita</i> (P.K.Latz 14752) live up to its formal name?	17
Stay on 2017 NSF funding for collections management	18

Web sites of interest

The Allan Cunningham Project	18
Ludwig Leichhardt writes home	18
<i>Environmental Weeds of Australia</i> via LucidMobile.	19
PowerPoint	19
Charles Chapman, botanical collector	19
Images of Berlin specimens.	19

ABRS report

Exhibitions	20
-------------------	----

<i>Where science meets art: the botanical illustrations of Rod Seppelt.</i>	21
<i>Notice. 2016 Membership Fees are now due</i>	23

Obituaries

Frank Badman, outback scientist 29 June 1943 – 26 September 2015	24
--	----

Death notices

Harry Butler	32
Tom Hartley (1931–2016)	33
R.F.G. Swinbourne (1936–2015)	34
Ray Alcock (1921–2015)	34

Moves and retirements

Peter Heenan of the Allan Herbarium, Lincoln	36
Recent retirements	37

Book reviews

Saint Jean.	37
A life painting banksias	40
In the exact footsteps of Allan Cunningham	42

New books	45
-----------------	----

Chapter conveners	47
-------------------------	----

Contacting major Australasian herbaria and systematics institutions	47
---	----

ASBS publications	48
-------------------------	----

About the Society and becoming a member	49
---	----

About the Newsletter: contributions, advertisements and the Editors	49
---	----